United States Court of Appeals

for the

District of Columbia Circuit

TRANSCRIPT OF RECORD

No. 10655

BRIEF AND APPENDIX FOR APPELLANTS

United States Court of Appeals
For the
District of Columbia Circuit
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In the
UNITED STATES COURT OF APPEALS
For the District of Columbia

[redacted]

William J. Montgomery and The Champion Paper and Fibre Company,
Appellants,

vs.

John A. Marzall, Commissioner of Patents,
Appellee.

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APPEAL FROM THE JUDGMENT OF THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA

Clarence M. Fisher,
National Press Building,
Washington 7, D. C.,

W. Brown Morton,
247 Park Avenue,
New York 17, N. Y.,

Attorneys for Appellants.

No. 10655

The Question Presented

The question is whether a process claim which recites "a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing" (*Cochrane* v. *Deener*, 94 U. S. 780, 788) is "indefinite" within the meaning of R. S. 4888 (U. S. Code Tit. 35, Sec. 33) because the quantity of a substance added in the course of the transformation is stated in terms of the condition resulting from the addition of the substance, where the quantity of the substance required to obtain the desired condition varies greatly with variations in the other ingredients employed and the other steps of the process.

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IN THE

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA

CIVIL ACTION NO. 34,734

◆

WILLIAM J. MONTGOMERY and THE CHAMPION PAPER AND FIBRE COMPANY,

Plaintiffs-Appellants,

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS,

Defendant-Appellee.

◆

BRIEF FOR APPELLANTS

Jurisdiction

This is an action against the Commissioner of Patents brought in the United States District Court of the District of Columbia under Section 4915 of the Revised Statutes—U. S. C. Title 35, Sec. 63. The complaint alleges, paragraph 4 (appellants' app. 2), that certain claims of the appellants' patent application Serial No. 436,970, to wit claims 31, 32 and 33 were refused by the Board of Appeals of the Patent Office and in its prayer for relief (appellants' app. 2, 3) asks that the Commissioner of Patents be authorized to issue to plaintiffs Letters Patent of the United States embodying said claims 31, 32 and 33.

This Court has appellate jurisdiction with respect to such actions by virtue of the Act of February 9, 1893, c. 74, Sec. 9, 27 Stat. 436, as amended, and as incorporated in the District of Columbia Code 1940 Edition, Title 17, Sec. 101.

Statement of the Case

The Lower Court held that appellants were not entitled to the claims in issue on the grounds that such claims are vague and indefinite at the precise point of novelty and fail to point out the invention with the distinctiveness contemplated by R. S. 4888 (35 U. S. C. 33). No opinion was handed down by the Lower Court except as embodied in the Findings of Fact and Conclusions of Law (appellants' app. 6-9).

The Invention

The Champion Paper Company, the owner of this invention, developed some years ago a process of making a new kind of coated paper now known as "cast coated" paper which was entirely different from the conventional processes previously employed. As appears from the testimony of the inventor, Mr. Montgomery, the invention of this application has contributed more than any other improvement to the commercial success of cast coated paper. With the invention herein described the process can be carried on twenty-four hours a day, day after day, as a continuous operation (appellants' app. 21), while without the improvement the process is not continuous.

Coated paper as the name implies, consists of a web of paper having on one or both surfaces a layer of material other than paper for the purpose of improving its appearance and enhancing its printing qualities. By the process universally employed for many years prior to the invention here in issue, the coating composition—usually a mixture of adhesive such as casein and a mineral filler such as finely ground clay, calcium carbonate and other pigments—was applied to the surface of the paper to be coated and was then air-dried, and after the coating was dried the surface of the coating was calendered by running it between rollers which served to polish the surface of the coating to whatever extent was desirable for the particular type of paper being made (appellants' app. 14). By the new process for making "cast" coated paper developed by Champion, the surface of the paper carrying the wet coating material is pressed against the surface of a large heated chromium-plated drum to which the coating tightly sticks when wet. As the drum revolves the water in the coating material evaporates through the paper and when the drum has nearly completed its revolution the coating composition is substantially dry and no longer adheres to the drum, so that the paper may be led away from the drum under a guide roller and thence to the winding rolls (appellants' app. 16-19, also Exh. 5—appellants' app. 61).

Cast coated paper so produced is not calendered. Instead, by reason of the fact that the coating remains immovably in contact with the polished surface of the drum until it is dry the face of the coating is a replica of the face of the drum and has the luster of the drum surface.

The improvement in the manufacture of cast coated paper to which the claims here presented are directed consists in the admittedly novel step of adding to the coating composition a small amount of oil for the purpose of maintaining on the face of the drum a film of oil so thin that the presence of the oil cannot be detected by rubbing the drum vigorously with a clean cloth or in any other manner (appellants' app. 25, 26). The maintenance of this film by the addition of oil to the coating in the manner fully disclosed in the specification solved a serious problem in the practical manufacture of cast coated paper. The problem, as explained by Mr. Montgomery (appellants' app. 21-23), was to insure the proper adherence of the coating to the cast surface throughout the major portion of the complete revolution of the casting drum, and then, at the right moment, to insure with equal certainty its complete release from the surface. Theoretically, the coating should, when dry, disengage itself from the casting surface, but as a practical matter it did not invariably do so. Instead, sooner or later particles of coating would begin to stick to the drum surface, with damage to the quality of the paper and impairment of the surface of the drum so that the machine had to be shut down and the drum surface thoroughly cleaned before operation could be resumed (appellants' app. 19, 20).

There was thus a double problem, of what caused the sticking and how to remedy it. After a great deal of experimentation it was found that if the drum surface carried a film of oil so thin that it was impossible to detect the film by rubbing the surface with a clean cloth, the dry coating would not stick to the drum surface, but the wet coating would stick for the full time required to insure the proper finish to the surface of the coating. This discovery, however, did not solve the problem, but immediately created a second problem, namely, how could a film of this infinitesimal thickness be produced and maintained?

On the one hand, no method of continuously applying oil could be devised which would not add too much oil, while on the other hand, if no oil were applied during the continued operation of the drum the film gradually disappeared unless replenished (appellants' app. 21-23). In the course of continued research the patentee discovered that the film could be maintained at the proper thickness for the operation desired by adding to the coating composition itself a small quantity of oil. He also discovered that while the required amount of oil varied with the kind of oil used for any particular coating composition, the kind of paper, and various other conditions (appellants' app. 24, 25), the right amount of oil could readily be determined by trial (appellants' app. 28, 29).

By watching the point in the rotation of the drum at which the paper disengages itself from the drum surface—where it "cracked off" the surface, in the parlance of the trade—the operator can maintain optimum conditions by the simple expedient of increasing the amount of oil in the coating if the crack-off point moved toward the take-off roll, and by reducing the percentage of oil in the coating if the crack-off point moved away from the take-off roll.* By the practice of the invention to which the present claims are directed, the Champion Paper Company, the assignee of the applicant's invention, has been able to maintain its cast coating process in continuous operation day after day for an indefinite period, whereas prior to that time the process could not be carried out continuously (appellants' app. 27), as it was necessary at frequent intervals to shut down the machine, and clean the drum.

On cross examination Mr. Montgomery briefly and accurately summarized the significance of the invention in the practical operation of the process.

> "Q. Then it is a fact, is it not, Mr. Montgomery, that if you use too much oil you don't get satisfactory paper, and if you use no oil or too little oil you do not get satisfactory paper?
>
> "A. Correct.
>
> "Q. Then it is further a fact, is it not, Mr. Montgomery, that somewhere between those limits of no oil and too much oil, if you use the right amount of oil you get very good coated paper?
>
> "A. Correct.

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* This is done in practice by adding a quantity of oil free coating composition to the vessel supplying the coating to the drum.

> "Q. And I understood you to testify, did I not, Mr. Montgomery, that between those limits one skilled in the art could find out where the dividing line was as to the proper amount of oil to use?
>
> "A. That's correct" (appellants' app. 30-31).

The Claims

The claims in the patent application in suit which have been refused by the Patent Office are claims 31, 32 and 33, as follows:

> "31. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it adheres to said casting surface; and thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition, that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.
>
> 32. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it is in

> contact with said casting surface; and thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, treating the casting surface to render it suitably wettable with said film-forming oil, and so adjusting the proportion of film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.
>
> 33. The improvement in the process of making cast surfaced coated paper as set forth in claim 32, wherein the treatment of the casting surface comprises the application thereto of a film of soap prior to the operation of pressing the wet coated side of the paper thereon.''

It is to be noted that the claims are true process claims, *i. e.*, each is a statement of the series of acts performed in the manufacture of ''cast'' coated paper, including the new steps added by this applicant to the process as previously practiced whereby a greatly improved result is obtained. Those steps (claim 31) are (1) the addition to the initial batch of coating composition of a film-forming oil, and (2) adjusting the percentage of oil during the continued operation of the process to maintain the desired effect from the oil. Claim 32 includes in addition a third novel step, viz., treating the casting surface to make it wettable by the film-forming oil. The film-forming oil in the coating composition does not alter the properties of the coated paper. The invention is not a composition of matter or an article of manufacture whose characteristics are affected by the materials of which it is made. The oil is useful solely in carrying out the process, to obtain and maintain a definitely stated operating condition. The quantity of oil is *per se* of no importance. It is important only to the extent that it contributes to the maintenance of the stated operating condition and any statement of the quantity of oil which did not include a statement of the operating condition maintained would not be a statement of the invention.

Before the Lower Court it was appellants' position that any additional limitations as to the quantity of oil would be mere surplusage if the stated limits are broad enough to include the quantities required under all possible circumstances. While if narrower limits are stated, the claims would be limited to exclude processes which did in fact embody the appellants' invention. The claims allowed (26-30, appellants' app. 43, 44) are limited to the use of the quantity of oil required to maintain the stated operating conditions but contain an additional limitation as to the quantity of oil, viz. 1/10 of 1% to 1% on the weight of the coating. This additional limitation does not render the claims more "definite and certain" but merely excludes from the protection of the patent processes embodying the appellants' invention wherein more than 1% of oil is used to maintain the same identical operating conditions.

In all the preferred modifications of the process of which numerous examples are given in the specification, the amount of oil is within the stated limits in the allowed claims but the testimony of the applicant, Mr. Montgomery (appellants' app. 24-27) makes it clear that equivalent results can be obtained with percentages of oil above the stated limits by changes which do not affect the quality of paper but merely render the oil less effective; hence the allowed claims leave the appellants virtually without protection.

The Findings of Fact

There are no facts in dispute although Findings Nos. 3 and 5 (appellants' app. 7, 8) are incomplete and indefinite to the point of being misleading. Undoubtedly one important step in the invention claimed resides in incorporating oil—described as "film-forming oil" in the coating composition employed in the manufacture of cast coated paper. That step however must be combined with the other steps recited in the claims particularly the step of adjusting the proportion of oil in the coating to obtain a complete separation of the dry coating from the casting surface without loss of adhesion while the coating is still plastic.

A process claim reciting a series of acts performed to obtain a new and useful result is analogous to a machine claim to a new combination of old elements. Patentability depends on the novelty of the combination not the novelty of the individual steps of the process or elements of the combination; hence the reference in Finding No. 3 to the Bradner patent No. 1,826,726 is misleading. This patent was not introduced by appellee as pertinent to the question of novelty but was offered by appellants because it was referred to in the decision of the Board of Appeals of the Patent Office (appellants' app. 58) and without the patent the discussion in the opinion is meaningless. The patent is directed to the reduction of "foaming" in paper coating compositions and the defects resulting from the use of compositions containing foam when the coating is dried and calendered as in the standard paper coating processes. The alleged novelty consists in the addition of pine oil to the coating composition. The patent recites that the use of oil as a foam-preventing agent is old but asserts for pine oil some particular virtues for which his patent was granted. From the meager reference to this patent in Finding No. 3 it would be assumed that the Bradner patent disclosed the novel steps of the process claimed whereas in fact the patent is not concerned with the manufacture of cast coated paper recited in the claims wherein the coating is tightly held against the casting surface but refers solely to the old process wherein the coating is air-dried and calendered.

Finding No. 5 is misleading in stating that the "invention" is described in the allowed claims by stating the proportion of oil required—but in the rejected claims the alleged invention is described in terms of the function or result of the oil. In the allowed claims as well as in the rejected claims the *invention* is described by reciting the sequence of steps followed in making the "cast" coated paper including the addition of oil in an amount to produce the desired condition of the casting surface, while the allowed claims (appellants' app. 43, 44) contain an additional limitation which excludes processes wherein the amount of oil used to produce the desired condition of the casting surface exceeds 1%.

The Conclusions of Law

We are in accord with the principles of law recited in Conclusions 1 and 2 (appellants' app. 8). Conclusions 3, 4 and 5 (appellants' app. 8-9) deal with the claims here in issue, and it is in these conclusions that the Lower Court is in error. They will be discussed in detail in our Argument. In substance they all rest on an erroneous interpretation of R. S. 4888.

Conclusions 6 and 7 (appellants' app. 9) that the appellants are not entitled to the claims in issue and that the complaint be dismissed will stand or fall with affirmance or reversal of conclusions 3, 4 and 5.

The Statute Involved

"U. S. Code Tit. 35 Sec. 33.

§ 33. Application for patent; description; specification and claim.

Before any inventor or discover shall receive a patent for his invention or discovery he shall make application therefor, in writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery. The specification and claim shall be signed by the inventor. No plant patent shall be declared invalid on the ground of non-compliance with this section if the description is made as complete as is reasonably possible. R. S. § 4888; March 3, 1915, c. 94, § 1, 38 Stat. 958; May 23, 1930, c. 312, § 2, 46 Stat. 376."

Summary of Argument

Point 1. The invention does not reside in adding to the coating composition a certain proportion of oil as distinguished from some other proportion, but in adjusting the proportion of oil in the coating composition as may be required to maintain a stated condition of the casting surface.

Point 2. The claims in issue accurately and definitely recite the steps as carried out in the actual practice of the process.

Point 3. Similar claims have been uniformly upheld by the Supreme Court and the Courts of Appeals of the several circuits as properly defining analogous processes.

Argument

Point 1. It is appellant's position that it is impossible to accurately and adequately claim the invention here in quantitative terms of the amount of oil to be used. The claims already allowed only partially cover the invention, and do not give the protection to which the plaintiff is entitled under the patent laws in return for the contribution he has made to the art of making cast coated paper. The allowed claims cover only processes in which highly effective oils, used in connection with particularly suitable casting surfaces under favorable conditions, are employed. To confine the patent to these claims would permit anyone to take advantage of the invention by using more than 1% oil in the coating, by employing a less effective oil, or a less suitable casting surface, or less favorable conditions, and thus profit by applicant's disclosure and at the same time avoid the claims.

In connection with this refusal of the Patent Office to grant the claims because the amount of oil is not specified numerically, it is important to note that the invention is a *process* invention. The appellant's invention relates solely to the manufacture of cast surfaced coated paper and is based on the discoveries (1) that an oil film of suitable thinness on the casting surface will prevent sticking of the dried coating and permit adherence of the coating to the casting surface, until the coating has set to its permanent form; and (2) that if the casting surface is wet or wettable with the oil, such a film can be *maintained* by adsorption from oil incorporated in the coating material, and (3) that the thickness—or thinness—of the film can be controlled within the required limits by adjusting the proportion of oil in the coating material by increasing the proportion of oil when the coating tends to stick to the casting surface, after drying, and decreasing the proportion of oil (adding oil-free coating material) when the dried coating fails accurately to reproduce the minute surface characteristics of the casting surface.

Varying amounts of oil are required to maintain the casting surface in the *same* condition, depending upon a number of other variables in the coating procedure.

POINT 2. A study of the claims in issue leaves no doubt as to what they mean, and they clearly tell to one skilled in the art precisely what to do to carry out the invention. In fact, claims 31, 32 and 33 are just as definitive of the invention as the allowed claims. Both the allowed and disallowed claims prescribe in substance that the amount of oil present in the coating must be present in large enough amount to cause the coated paper to detach cleanly from the casting surface after it has dried but not so much as to prevent it adhering while wet. There are undoubtedly coating compositions containing between .1 and 1% oil which will not fulfill these conditions and there are coating compositions containing more than 1% oil which do. The numerical amount of oil present is therefore not the essential element of the claims; it does not define the invention.

Claim 31 is the broadest of the three claims in dispute. It begins with the words "In the process" and then follows a reference to the known process of making cast coated paper. This is a common form of patent claim and brings into sharp relief what is old and what the applicant claims to be new. In the present case the new part follows the word "improvement". This improvement consists of two steps: first, incorporating into the coating composition prior to its application to the paper, a film-forming oil; and second, adjusting the proportion of the oil so that in continued operation the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent. There is certainly nothing vague or indefinite about this language. On the other hand, it does in fact accurately define the invention—more so in fact than by stating that the quantity of oil must be between specified limits. Mr. Montgomery, who certainly qualified as one skilled in this art, testified that the language of the claims in issue, conveyed to one skilled in the art the necessary information to properly carry out the process (appellant's app. 27-28).

The patent specification and Mr. Montgomery's testimony (appellants' app. 24-25) disclose the fact that there are many variables that affect the optimum quantity of oil to be used in the coating composition. The nature of the casting surface (*e. g.,* chromium, stainless steel, rolled nickel, electrolytic nickel, glass, etc.), the nature of the coating composition (*e. g.,* kind and proportion of pigments, kind and proportion of adhesive, the degree of alkalinity (pH, of the coating), the temperature of the casting surface, the speed of operation, the kind of paper base employed, the moisture content of the paper, the weight of coating to be applied, and above all the kind of oil and its degree of emulsification in the coating, all affect the quantity of oil necessary to give the best results. To specify in patent claims the amounts of oil to be used under every combination of these variables would be an utterly unreasonable requirement. Instead the claims set forth a simple practical test of performance.

Clearly the novelty resides in a combination of process steps and not, in a specific proportion of oil which differs with different casting surfaces, different coating compositions, different oils, and different methods of incorporating the oil—degree of emulsification, etc. (appellants' app. 24-25). This being the case the Court below was in error in holding that there is in the claims at bar any indefiniteness "at the precise point of novelty" (Conclusion of Law, No. 4, appellants' app. 9).

The Court below, was also in error in the fourth Conclusion of Law, in holding that the claims at bar are "not sufficiently definite for patentability," because of the lack of any specific limits on the proportions of oil to be incorporated into the coating material.

This holding of indefiniteness is not supported by the sixth finding of fact made by the Court below, to the effect that

> "* * * as between the limits of using too little oil, or too much oil, depending upon the characteristics of the particular coating composition, one skilled in the art could find out where the dividing line was, as to the proper amount of oil to use to make satisfactory coated paper."

The third Conclusion of Law (appellants' app. 8) viz.:

> "In the claims at bar, the step of 'adjusting the proportion of said film-forming oil * * *' is dependent upon the result desired, rather than the result being dependent upon the step."

is also in error. It is clear from the specification page 3, line 22 to page 5, line 4 that the results secured are vitally dependent on the step of adjusting the proportions of film-forming oil in the coating composition. Unless this adjustment is made and maintained the dried coated paper will either stick to the casting surface or will not have a cast surface. The fact that the degree of adjustment required is best measured by its effect on the results, does not in any way lessen the dependence of the results on the adjustment.

Point 3. Before the Board of Appeals of the Patent Office it was asserted that the case of *Minerals Separation, Ltd.* v. *Hyde,* 242 U. S. 261, presented a state of facts on all fours with the present case, and that the statement of the law as embodied in the opinion of the Supreme Court in that case should control the decision here. That case involved the separation of the metallic portions from the non-metallic portions of ores of copper and other metals. The essential steps of the process are set forth in the opinion.

Minerals Separation, Ltd. v. *Hyde,* 242 U. S. 261, 265:

> "The process of the patent in suit, as described and practiced, consists in the use of an amount of oil which is 'critical,' and minute as compared with the amount used in prior processes 'amounting to a fraction of one per cent. on the ore,' and in so impregnating with air the mass of ore and water used, by agitation—'by beating the air into the mass'—as to cause to rise to the surface of the mass, or pulp, a froth, peculiarly coherent and persistent in character, which is composed of air bubbles with only a trace of oil in them, which carry in mechanical suspension a very high percentage of the metal and metalliferous particles of ore which were contained in the mass of crushed ore subjected to treatment. This froth can be removed and the metal recovered by processes with which the patent is not concerned."

The ruling of the Supreme Court on the defense that the claims were invalid because not limited to the precise amount of oil employed in the process was as follows (at 270):

> "Equally untenable is the claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results. Such variation of treatment must be within the scope of the claims, and the certainty which the law requires in patents is not greater than is reasonable, having regard to their subject-matter. The composition of ores varies infinitely, each one presenting its special problem, and it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case. The process is one for dealing with a large class of substances and the range of treatment within the terms of the claims, while leaving something to the skill of persons applying the invention, is clearly sufficiently definite to guide those skilled in the art to its successful application, as the evidence abundantly shows. This satisfies the law. *Mowry* v. *Whitney,* 14 Wall. 620; *Ives* v. *Hamilton,* 92 U. S. 426, and *Carnegie Steel Co.* v. *Cambria Iron Co.,* 185 U. S. 403, 436, 437."

In its decision, the Board of Appeals held that the *Minerals Separation* case was not applicable here because in the claims there involved the amount of oil was limited to less than 1%. Appellants requested a rehearing, which request appears in Exhibit 1 as Paper No. 17 (appellants' app. 51).

The rehearing was not granted, but the Board of Appeals treated the request as a petition for reconsideration and filed a supplemental opinion (Paper No. 18 of Exhibit 1, appellants' app. 57). The error in the decision of the Board of Appeals seems to us apparent on its face. In the *Minerals Separation* case the amount of oil used in the new process was always under 1%, so that that limitation did not exclude from the claims any process wherein the principle of the invention was used. The limitation to less than 1% in the *Minerals Separation* case merely limited the claims to exclude other types of flotation processes, using larger amounts of oil,* just as the claims here before the Court are limited to the steps of forming cast coated paper to distinguish the process from processes of making other types of coated paper.

The applicant here is the first to use oil in any quantity in the making of cast coated paper. Apparently the only other use of oil in the paper coating industry is as an anti-foaming agent, as exemplified by Patent No. 1,826,726 (Plaintiffs' Exhibit 6).

The ruling of the Supreme Court in the *Minerals Separation* case has been repeatedly followed by the Supreme Court in other cases and in various Courts of Appeals.

Eibel Process Company v. *Minnesota & Ontario Paper Company,* 261 U. S. 45, 65-66, 1923:

> "The next objection to the patent which prevailed in the Circuit Court of Appeals is that its terms are too vague because the extent of the factor of pitch is not defined except by the terms 'substantial' and 'high.' The figure accompanying the specification

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* "The prior processes which we have described required the use of so much oil that they were too expensive to be used on lean ores, to which they were intended to have their chief application, and the efforts of investigators for several years prior to the discovery of the process in suit had been directed to the search for a means or method of reducing the amount of oil used * * *" (242 U. S. 261 at p. 266).

and illustrating the improvement indicates an angle of four per cent. or an elevation of 12 inches, and the reference to the small elevations for drainage shown in earlier devices indicates that the patentee had in mind elevations substantial as compared with them in order to achieve his purpose of substantially increasing the speed of the stock. It was difficult for him to be more definite, due to the varying conditions of speed and stock existing in the operations of Fourdrinier machines and the necessary variation in the pitch to be used to accomplish the purpose of his invention. Indefiniteness is objectionable because the patent does not disclose to the public how the discovery, if there is one, can be made useful and how its infringement may be avoided. We do not think any such consequences are involved here. This patent and its specifications were manifested to readers who were skilled in the art of paper making and versed in the use of the Fourdrinier machine. The evidence discloses that one, so skilled, had no difficulty, when his attention was called to their importance, in fixing the place of the disturbance and ripples to be removed, or in determining what was the substantial pitch needed to equalize the speeds of the stock and wire at that place. The immediate and successful use of the pitch for this purpose by the owners of the then fastest machines and by the whole trade is convincing proof that one versed in paper making could find in Eibel's specifications all he needed to know, to avail himself of the invention. Expressions quite as indefinite as ‘high’ and ‘substantial’ in describing an invention or discovery in patent specifications and claims have been recognized by this Court as sufficient. In *Tilghman* v. *Proctor*, 102 U. S. 707, the claim sustained was for ‘the manufacturing of fat acids and glycerine from fatty bodies by the action of water at a high temperature and

pressure.' See also *Rubber Co.* v. *Goodyear,* 9 Wall. 788, 794; *Mowry* v. *Whitney,* 14 Wall. 620, 629; *Lawther* v. *Hamilton,* 124 U. S. 1, 9; *Carnegie Steel Co.* v. *Cambria Iron Co.,* 185 U. S. 403, 436; *Abercrombie & Fitch Co.* v. *Baldwin,* 245 U. S. 198, 205."

Chadeloid Chemical Co. v. *Wilson Remover Co., et al.,* 224 Fed. 481, 484 (C. C. A. 2), 1915:

"We see no ground for criticism of the patent *per se.* In fact we think the patentee and the officials of the Patent Office are to be commended for having issued a chemical patent where the description and claims cover less than a page. The patent is clear, concise and intelligible to laymen. The criticisms are not well founded. It was not necessary or wise to specify the exact proportion of wax, as this differs according to the work being done. Had the exact percentage been named, anyone could evade the patent by using more or less than the specified amount and thus could have secured all the advantages of the invention without the payment of a dollar."

Burke Electric Co. v. *Independent Pneumatic Tool Co.,* 232 Fed. 145, 148 (C. C. A. 2), 1916:

"As regards the brush position the defendant's case is even weaker. The exact angle of the brushes could not be predetermined, because it varies with the general structure and relation of the parts. To give any angle would have been a miscue; the angle must be found experimentally when the rest of the motor is designed. That experiment is, however, not the kind which requires any independent invention by one who would follow the patent, and which thus leaves the specification imperfect. You need only plot the two curves on the respective currents, and

> you will always find an area of substantial coincidence, within which the brushes should be put. Westinghouse Electric Mfg. Co. v. Montgomery Electric Light Co., 153 Fed. 890, 82 C. C. A. 636. It is as if a chemist were directed to add enough of an element to secure precipitation. Such a recipe would be an absolutely accurate guide to the result though the quantity varied with temperature or atmospheric humidity. What men need is a path to the goal; they will not be curious of the country it traverses.''

In regard to a claim similar to those presented here, the Court of Appeals of the Fourth Circuit said:

> ''There are many situations in the practice of the arts in which specific directions are properly omitted from the claims of patents because greater definition is either impracticable or is unnecessary to inform the art, and would serve only unduly to limit the scope of the invention or to invite evasion by those who desire wrongfully to misappropriate the substance of the invention.'' (*Procter & Gamble* v. *Refining,* 57 USPQ 505, 135 F. 2d 900, C. C. A. 4th, 1943.)

This holding of the Court is equally applicable to the present case. The limitation to a maximum of one per cent of oil, in the allowed claim, would serve ''*unduly to limit the scope of the invention*'' since, as set forth in the testimony of Mr. Montgomery (appellants' app. 25), the process of the present invention is operable with coating compositions having oil contents well over one per cent. The limitation to one per cent in the allowed claims is clearly such, in view of the record in the Court below, as ''*to invite evasion by those who desire wrongfully to misappropriate the substance of the invention.*'' Further, as in the case cited ''greater definition is * * * impracticable,'' because there are many factors which affect the proportions of oil needed (appellants' app. 22, 23).

For the foregoing reasons the fifth Conclusion of Law, that ''The claims at bar fail to point out the invention with the distinctness contemplated by R. S. 4888 (35 U. S. C. 33)'' is also in error and should be reversed. The same is true of Conclusions numbered 6 and 7 which are dependent for their validity on the validity of the preceeding conclusion.

The judgment of the District Court should be reversed and the relief prayed for should be granted.

Clarence M. Fisher,
W. Brown Morton,
Attorneys for Appellants.

APPENDIX

In the

DISTRICT COURT OF THE UNITED STATES

For the District of Columbia.

Civil Action No. 34,734.

William J. Montgomery and Champion Paper and
Fibre Company, Hamilton, Ohio,
Plaintiffs,

v.

Casper W. Ooms, Commissioner of Patents,
Washington, D. C.,
Defendant.

Complaint for Issuance of United States Letters Patent.

1. The jurisdiction of this Court depends upon the Patent Laws of the United States, this Complaint being filed under Section 4915, Revised Statutes (Comp. Stats. 9460; U. S. C. Title 35, Section 63), as amended by Act of March 2, 1927.

2. The plaintiff, William J. Montgomery, is the sole inventor of the subject-matter disclosed and claimed in an application for United States Letters Patent for improvements in Coated Paper, filed by him on March 31, 1942, Serial No. 436,970.

3. The plaintiff, Champion Paper and Fibre Company, an Ohio corporation, is the owner by assignment of the

entire right, title and interest in and to said application Serial No. 436,970 and any patent or patents that may issue thereon. Such assignment or a duly certified copy thereof from the assignment records of the Patent Office will be produced at the trial.

4. The Board of Appeals of the United States Patent Office in a decision rendered on the 8th day of November, 1945, refused to allow three claims of said application Serial No. 436,970, to wit, claims numbered 31, 32 and 33 presented by amendment filed March 2, 1944, constituting Paper No. 8 of the Patent Office proceedings with respect to said application, as will more fully and at large appear from a certified copy of such Patent Office proceedings ready in Court to be produced.

5. The defendant, Casper W. Ooms, Commissioner of Patents of the United States, by the aforesaid decision of the Board of Appeals of the United States Patent Office has refused and still refuses to grant Letters Patent of the United States to the plaintiffs on said application Serial No. 436,970, including said three claims numbered 31, 32 and 33 above referred to.

6. The said decision of the Board of Appeals was rendered on or about the 8th day of November, 1945, and within six months last past, and no appeal has been taken from said decision of the Board of Appeals to the Court of Customs and Patent Appeals, and no such appeal is pending or has been decided.

WHEREFORE, the plaintiffs demand that this Honorable Court authorize the Commissioner of Patents to issue to plaintiffs Letters Patent of the United States embodying said claims 31, 32 and 33, upon the filing in the United States Patent Office of a certified copy of such adjudication, and upon compliance with the requirements of the law in such cases made and provided.

William J. Montgomery,
Champion Paper and Fibre Company,
By Clarence M. Fisher,
Attorney for Plaintiffs,
834 National Press Building,
Washington 4, D. C.

W. B. Morton,
of Counsel.

Answer to the Complaint.

In the

DISTRICT COURT OF THE UNITED STATES,

For the District of Columbia.

Civil Action No. 34,734.

William J. Montgomery and Champion Paper and Fibre Company,

Plaintiffs,

v.

Lawrence C. Kingsland, Commissioner of Patents,

Defendant.

W. W. Cochran, Solicitor,
United States Patent Office,
Washington 25, D. C.,
Attorney for Defendant.

To the Honorable the Justices of the District Court of the United States for the District of Columbia:

1. Defendant admits the allegations of paragraph 1.

2. He admits that on March 31, 1942, plaintiff William J. Montgomery, claiming to be the sole inventor of alleged improvements in Coated Paper, filed an application in the Patent Office for a patent thereon, to which application Serial No. 436,970 was given. He denies that claims 31, 32 and 33 of said application particularly point out and distinctly claim the alleged invention.

3. He is without knowledge or information sufficient to form a belief as to the truth of the allegations of paragraph 3.

4. He admits the allegations of paragraph 4.

5. He admits that he has refused and still refuses to issue a patent on said application containing any one of claims 31, 32 and 33 thereof. He denies that plaintiffs are lawfully entitled thereto. He states that said claims 31, 32 and 33 fail to comply with the requirements of Section 4888 R. S. (U. S. C., title 35, sec. 33) in that they do not particularly point out and distinctly claim the part, improvement or combination which the plaintiff William J. Montgomery claims to be his invention or discovery, as will more fully appear from the Examiner's statement and the decisions of the Board of Appeals, dated November 8, 1945, and December 17, 1945, copies of which will be furnished at the trial.

6. He admits the allegations of paragraph 6.

s/ W. W. Cochran,
Solicitor, U. S. Patent Office
Attorney for Defendant.

January 26, 1948.

I hereby certify that a copy of this Answer to the Complaint was mailed today, January 26, 1948, to the attorney for plaintiffs, Mr. Clarence M. Fisher, National Press Building, Washington, D. C.

s/ W. W. Cochran,
Solicitor.

Findings of Fact and Conclusions of Law.

In the

UNITED STATES DISTRICT COURT,

For the District of Columbia.

Civil Action No. 34,734.

William J. Montgomery and Champion Paper and Fibre Company,

Plaintiffs,

v.

John A. Marzall, Commissioner of Patents,

Defendant.

Findings of Fact.

1. This is an action under R. S. 4915 (35 U. S. C. 63). The plaintiff Champion Paper and Fibre Company is owner by assignment from the other plaintiff, William J. Montgomery, of his application for patent Serial No. 436,970 for Coated Paper. The plaintiffs seek to have the Court authorize the allowance of claims 31, 32 and 33 of said application, which claims were refused by the Board of Appeals.

2. The plaintiffs' application here involved discloses a process of making cast surface coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper, pressing the coated

surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent, drying the coated surface of the paper to a substantially non-plastic condition while it adheres to the casting surface and thereafter removing the coated paper therefrom. The improvement alleged to reside in the claims at bar is claimed to be incorporating into the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of the film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent. The quantity of oil required to obtain the adhesion of the plastic coating composition to the casting surface and its release from the casting surface when the coating composition becomes non-plastic varies greatly, depending upon the ingredients of the coating composition, its acidity, the particular oil used, the extent to which it emulsified, and other factors; and to be useful must be adjusted with respect to such variable characteristics of the coating composition.

3. Plaintiffs' application alleges that the present invension is an improvement upon the process disclosed in patent No. 1,719,166. It was old in the prior art to add oil to the coating material for paper, as shown by the patent to Bradner No. 1,826,726, to reduce foaming. The foaming of paper coating compositions is undesirable in all types of coating processes. The quantity and character of oil effective to reduce foaming has no relation to the quantity and character of oil required for the practice of the process claimed.

4. Certain of the claims of the application were allowed. The allowed claims specify the quantity of oil to be used

as a range which includes the quantities prescribed in the specific examples recited in the specification.

5. The invention claimed in the rejected claims is a process of making cast coated paper all the essential steps of which are recited in the claims. The novelty resides in the addition of oil to the coating composition as one of the steps of that process. The rejected claims do not specify a definite amount of oil, but merely state that the proportion of oil, without stating what that proportion may be, is so adjusted as to accomplish the recited function or result.

6. Plaintiffs' testimony shows that, as between the limits of using too little oil, or too much oil, depending upon the characteristics of the particular coating composition, one skilled in the art could find out where the dividing line was, as to the proper amount of oil to use to make satisfactory coated paper.

CONCLUSIONS OF LAW

1. A method claim, to be patentable, should state the steps responsible for the result.

2. Mere statement of the result in a method claim, without definitely stating the step responsible for the result, does not "particularly point out and distinctly claim" the invention, as required by R. S. 4888 (35 U. S. C. 33).

3. In the claims at bar, the step of "adjusting the proportion of said film-forming oil * * *" is dependent upon the result desired, rather than the result being dependent upon the step.

4. The claims at bar are vague and indefinite at the precise point of novelty and not sufficiently definite for patentability.

5. The claims at bar fail to point out the invention with the distinctness contemplated by R. S. 4888 (35 U. S. C. 33).

6. The plaintiffs are not entitled to a patent containing any of claims 31, 32, and 33, as set forth in the application and in the complaint.

7. The complaint should be dismissed as to all of the claims at bar.

Matthews,
Judge.

Judgment.

In the
UNITED STATES DISTRICT COURT,
For the District of Columbia.

Civil Action No. 34,734.

William J. Montgomery and Champion Paper and Fibre Company,
Plaintiffs,
v.
John A. Marzall, Commissioner of Patents,
Defendant.

This action came on to be heard at the last term and thereupon, upon consideration thereof, it is, this 17th day of March, 1950,

Adjudged that the complaint in this case be, and the same hereby is dismissed with costs against the plaintiffs.

Matthews,
Judge.

Approved as to form:

Clarence M. Fischer,
Attorney for Plaintiffs.

Notice of Appeal.

In the
UNITED STATES DISTRICT COURT,
For the District of Columbia.

Civil Action No. 34,734.

William J. Montgomery and Champion Paper and Fibre Company,
Plaintiffs,
v.
John A. Marzall, Commissioner of Patents,
Defendant.

Notice is hereby given, that William J. Montgomery, and Champion Paper and Fibre Company, plaintiffs above named, hereby appeal to the United States Court of Appeals for the District of Columbia from the final judgment entered in this action on March 17, 1950.

Clarence M. Fischer,
Attorney for Plaintiffs,
National Press Building,
Washington 4, D. C.

Dated: April 18th, 1950.

IN THE
UNITED STATES DISTRICT COURT,
FOR THE DISTRICT OF COLUMBIA.
C. A. No. 34,734 (Patent).

MONTGOMERY, *et al.*,
Plaintiff,
v.
KINGSLAND,
Defendant.

Washington, D. C.,

Wednesday, November 30, 1949.

The above-entitled case came on for trial at 10 o'clock, A. M., on Wednesday, November 30, 1949, in the United States District Court for the District of Columbia, in Room 1318 Justice Department, Washington, D. C.

Before:

HONORABLE BURNITA SHELTON MATTHEWS, District Judge of the United States District Court for the District of Columbia.

APPEARANCES:

W. B. MORTON, Esq., and C. M. FISHER, Esq., on behalf of the plaintiff; and
H. S. MILLER, Esq., on behalf of the defendant.

Mr. Morton: I have here an extra copy of the application papers. We offer an official certified copy as an exhibit.
Mr. Miller: No objection.
The Court: It will be received.

(The document referred to was marked Plaintiff's Exhibit No. 1 and received in evidence.)

Mr. Morton: Now I will call Mr. Montgomery. Thereupon—

William J. Montgomery, the plaintiff in the above-entitled action, was called as a witness on his own behalf, and being duly sworn, was examined and testified as follows:

Direct Examination by Mr. Morton:

Q. Mr. Montgomery, will you state your name and residence please? A. William J. Montgomery, 435 North D Street, Hamilton, Ohio.

Q. And what is your occupation, Mr. Montgomery? A. I am director of general research for the Champion Paper & Fibre Company.

Q. And the Champion Paper & Fibre Company are the plaintiff in this action, and you are the applicant, is that correct? A. Yes, sir.

Q. I hand you what purports to be an assignment of a Patent Office application and ask you to state whether or not that is the assignment that you executed of the application here in court to the Champion Paper & Fibre Company. A. It is.

> Mr. Morton: I will offer the assignment to the application as Plaintiff's Exhibit No. 2.
>
> Mr. Miller: No objection.
>
> The Court: It may be received.
>
> (The document referred to was marked Plaintiff's Exhibit No. 2 and received in evidence.)

By Mr. Morton:

Q. Mr. Montgomery, what is the business of the Champion Paper & Fibre Company? A. Champion Paper & Fibre Company is a producer of pulp and maker of papers. We make both coated and uncoated papers.

Q. Will you tell us briefly what is coated paper? A. Coated paper is intended to improve the appearance and particularly the printing quality of paper. That is its reason for existence. It is made by taking the paper you are all familiar with, and on that a thin layer of a pigment, a non-soluble material like white clay, calcium carbonate, is cemented with a minor quantity of an adhesive. The usual adhesives are starch, casein, and materials of that sort.

That is then finished by a calendering operation, which is rolling it between steel rolls, alternate steel and compressed-fibre rolls, which polish the surface, smoothing it out.

The particular advantage of the coating is that it has a fine capillary structure which absorbs the printer's ink so that it strikes in where the type puts it in a letterpress operation—gives a high fidelity of reproduction.

Q. Is this leaflet that I hand you a sample of the high-grade coated paper put out by your company at the present time? A. It is.

> Mr. Morton: I would like to offer this sample as Plaintiff's Exhibit 3, as a sample of the coated paper, coated by the customary process.
>
> Mr. Miller: No objection.
>
> The Court: It may be received.
>
> (The sample referred to was marked Plaintiff's Exhibit No. 3 and received in evidence.)

By Mr. Morton:

Q. Now will you tell us what is cast-coated paper? A. Cast-coated paper is coated as in the conventional paper in the sense that it has a thin layer of mineral pigment, an insoluble white pigment, normally white, bonded with a minor quantity of adhesive. It likewise is intended to achieve the same results of giving this fine capillary structure which will absorb the ink. It gives also the high gloss in the printing.

It differs from the other paper in that it is made by a casting operation. In the former you merely spread this layer out and meter and smooth it by any of many means. In the cast operation you cast it against this polished surface, where it is dried. Since paper is not of uniform thickness—if you look through a sheet of paper you will see on it light and dark areas; those are thick and thin spots—in the calendering operation the thick spots get squeezed more and become less absorbent to ink; you crowd the capillaries together, or close some of them.

In our casting operation—the cast paper—that does not occur, since there is no particular pressure exerted on it. It is merely stuck to this casting surface, dried, comes off with essentially a replica of the surface.

That gives us an advantage on that. With the ordinary papers you are forced to choose pigments and adhesive which will permit them to flow under this super-calendering operation. With the cast paper we have not that restriction. We are able to use pigments which have the degree of absorbency for the printer's inks that we choose, along with the brightness and other characteristics desired.

Q. I ask you to state whether or not this folder which I have just handed you is a sample of your cast-coated paper which you have just described. A. It is.

Mr. Morton: I will offer the folder as Plaintiff's Exhibit No. 4.

Mr. Miller: No objections.

The Court: It may be received.

(The folder referred to was marked Plaintiff's Exhibit No. 4 and received in evidence.)

By Mr. Morton:

Q. Now, Mr. Montgomery, I will ask you to state what is shown in this drawing which I handed you. A. That is the diagram of the casting operation and the equipment used therein.

Mr. Morton: I will offer the drawing identified by the witness as Plaintiff's Exhibit No. 5.
Mr. Miller: No objection.
The Court: It may be received.

(The drawing referred to was marked Plaintiff's Exhibit No. 5 and received in evidence.)

By Mr. Morton:

Q. Now, Mr. Montgomery, referring to the drawing that has just been offered as Exhibit No. 5, will you describe briefly just how this operation of making cast-coated paper is carried out commercially in your factory? A. The casting part of the operation starts with a roll of paper made in the conventional manner on a paper machine which is unwound on a stand not shown in this diagram. The web of paper, as indicated, coming from the unwinder, goes under a fly roll and then over a roll rotating in a pan of coating which applies an excess of coating to the surface of the paper.

Q. That roll is identified in the drawing— A. As the coating-applying roll, and the pan indicates the coating material. It then goes under a curved bar to spread it, not identified in this picture, but shown. It then goes between a press roll identified as the roll pressing wet coating on wet paper into contact on the drum, which is a relatively small diameter soft-rubber covered roll. It is forced against the drum and the paper by this stiffer roll identified as a backing roll.

The drum shown and not labeled is a steel weldment. We make them in various widths. The widest ones now operated are 100 inches wide. They are approximately 12 feet in diameter. They weigh around 45,000 pounds. The surface is accurately machined, is chrome-plated, and is polished to a mirror finish. You can see your reflection in one of those drums.

The pressing operation serves several functions. It first limits the weight of coating from that excess supply, the excess being squeezed off and dropping back into the pan around the coating-applying roll. The coating is pressed out flush against, and molded to, stuck to, the chrome surface by that soft backing roll. That forces the paper into continuous contact with the drum, and the coating compositions are so chosen that they will stick to the drum at that stage.

The drum is heated to controlled temperatures, in commercial operation around 185 degrees Fahrenheit, by a mixture of steam and air, to control that temperature.

The drum is driven by a variable-speed drive mechanism so that its speed can be adjusted to suit the requirements—weight of paper and coating, for example. As the paper is cemented, and as the drum rotates, the paper proceeds on around this casting surface. As it does so, the water is vaporized by the heat in the drum, passes as vapor through the web of paper backing it up, and goes on around the surface approaching this point indicated as the limiting location.

In operation, before it reaches that point in commercial operation, the paper will suddenly shrink. You can visibly see it change its width as it dries out. You see, it has been wet, and it is cemented down. As it dries, it tends to shrink, and you can hear that snap as the paper lets go. It is a continual snap as it runs.

You see, the slight amount of coating, which is on the drum beyond it, is out away from the edge of the paper as it approaches this point of separation from the drum, this limiting location.

> The Court: Does the paper always come off at that particular location, or does it keep on—?
>
> The Witness: Normally, to be commercially safe, the operators run at a speed and under conditions so that this snap-off takes place up at a place, perhaps, where this legend of "Internally-heated Rotating Drum" is. Actually, it would be perfectly satisfactory if it let go just at the moment it reaches this limiting point. That is not commercially feasible to hold it there, so that a factor of safety is always used so that it cracks off somewhere in this range, not exactly the same place.
>
> The web now is free from the drum. You can take it with your fingers and just lift it away, if it wasn't for the tension. I mean, it is no longer stuck. It goes on around this take-off roll and is wound up into rolls for finishing into sheets and the normal finishing operation.

By Mr. Morton:

Q. The paper that comes off the drum has, without further processing the finish that appears in this sample that we have introduced, is that correct? A. That is correct. The paper going on is the rough, dull-finish, uncoated paper. We apply the coating here that is molded by the pressure of the roll against that drum. It then solidifies in that form. That is the casting operation, changing from the liquid to the solid, in contact with this polished surface. Then as it comes off, it retains that gloss to a large degree.

> The Court: All of this operation takes place on the outside of this?

The Witness: Yes. You press it against the outside, which is the polished surface of this drum, and it runs on around continuously and then is wound up into rolls. There is a joint at the end of each roll every 30,000 feet, or someting like that, but otherwise continuous.

By Mr. Morton:

Q. Is it important in this operation that you have just described that the coating remain immovably stuck to the drum surface until it is dry? A. Yes, sir.

Q. What is the effect of the coating breaking away from the drum surface before it is thoroughly dry? What effect does that have on the product? A. If your paper with the unsolidified coating is released, it then approaches this conventional coated paper in that it can now dry without restraint. The drying takes place here under proper conditions with the coating surface stuck to this polished surface, which means that all the shrinkage and drying takes place with that held in one plane, and it solidifies in that form. If it is still wet and is separated, then as it dries the natural shrinkage in the sheet will pull the coating out of that plane surface and make it any other shape such as the paper happens to wish—wish, I don't imply volition there—as it may take from its internal structure.

Q. Does that dull the gloss of the finish? I mean, does it impair the quality of the paper if it breaks away too soon? A. It does.

Q. What would happen if the coating remained stuck to the drum past the point which you marked there as limiting location for complete crack-off? A. There are two degrees in that case, that if it sticks in small, isolated areas, normally the paper will go right on, it will pick out and stay, part of it will stay stuck to the casting surface and the sheet will go on with either a portion of the coating picked out and stuck to the drum or a piece of the paper torn right out. That is in isolated locations.

If the entire sheet sticks, then it just goes right on, tears off and goes on around, wraps the drum and we are forced to shut down and completely clean up.

When these isolated areas stick, we can sometimes by promptly slowing down the drum clean those off right while it is running, and resume operation. If it sticks and wraps, then it is necessary to shut down and start over.

Q. What do you do in your commercial operation to insure the separation of the coating from the surface of the drum at the proper point in the rotation of the drum? A. We add oils in there which we believe form a film on there and control this release without impairing the adhesion up to the time the coating is set.

Q. In connection with that, did you, or do you also give any special preparation to the surface of the drum? A. We do. The best example is when we start a new drum in service, that the standard procedure in starting a new drum is to first buff it. The buffing is done with a high-speed revolving series of sheets of cloth held more or less rigidly out by centrifugal force. On that is applied a mixture of a mild abrasive in some usually greasy material which can be modified to quite a number of degrees. That serves two purposes. It cleans any foreign matter which might have gotten on this surface prior to our attempt to start it up, and also enhances the polish and makes it accept oils more readily.

Then we start up and with our normal coating, except that in this pan where it is marked "Coating Material," the operators will dump some uncontrolled but relatively large amount of whatever oily material is normally going to be used. The object of that is to get the first sheets over with no sticking, get the machine rolling. That is the object of that.

This diagram doesn't show it, but that coating supply is continuously maintained in there so that by a process of dilution, you use out that high-oil-content coating. That is normally low-finish paper, but there is the remains of this buffing compound, so that the first few feet are discolored, and those are discarded.

Normally, unfortunately, in starting up there is a roll out of alignment, so we frequently have wrinkles and things like that in starting a new drum, so it is no economic hardship.

Q. Then you put in this greater amount of oil? A. At the start. The coating that is fed in continuously from then on contains the normal amount as determined by previous experience.

Q. And with that oil in there can you run the process continuously, day after day, 24 hours a day? A. We do.

Q. Seven days a week? A. Yes.

Q. So, unless something goes wrong, it is a continuous manufacturing operation, is that correct? A. Essentially continuous.

Q. Was this cast-coat process for manufacturing coated paper developed in the research department of which you are now director? A. It was.

Q. When was that developed and started? A. The development was under way in 1927 when I came with the company.

Q. And when the process was turned over to the production department of the company? A. It was turned over to our production department in 1942.

Q. What were the principal difficulties that you ran into in your development of this process in the period that it was in the research department? A. The principal difficulties were the difficulties we experienced in getting a perfect casting surface, sufficiently perfect casting surface; the difficulties we had in eliminating sticking of the coating to the sheet when we had it stuck tight enough to cast. I mean, we could make it stick without any trouble, but then to avoid sticking so that we could remove the paper commercially. And the third principal difficulty was in controlling the quality of the sheet within commercial limits as to finish and absorption, and so on.

Q. What did you do in your experimental efforts to correct this sticking of the coating to the drum past the point where it should separate itself? A. Well, we tried everything we could think of, but the ones that seemed most pertinent as a consecutive effort were—our first thought that those were principally, if not entirely due to defects in the casting surface. We explored that after, for considerable time, attempting to get better and better casting surfaces. Then as we improved that, we were forced to the realization that that was not the only thing that caused sticking. We then suspected foreign materials either coming from the air or getting on in any other manner, on the surface of this chrome, as being the cause of the trouble.

We spent a great deal of effort attempting to clean these casting surfaces to eliminate that. Then we were unable by that technique to achieve commercial success. We then observed that right after we had polished the drum it seemed to work better. We assumed that that might be a change—these surfaces were principally chromium—due to this change from active to passive chromium.

Chromium exists in two states which have widely different properties. One is noble. The passive is noble compared to the active state. The polishing is supposed to make it active.

We followed that lead rather intensively for some time. In following that up we were coating—this was working on a strictly experimental basis, so we only worked in the day shifts, and each night we would thoroughly cover the experimental dum with oil to prevent oxidation. The drum would be heated, and heat and oxygen are supposed to promote the passive state in chromium.

To prevent that we oiled the drum at night. We observed that when we would start up the next morning, that normally the paper would come off very easily for a longer or shorter time, but that the finish was lower than we desired. As it continued to run, the finish would get higher and higher, and normally we would run into our sticking trouble either locally or generally.

That was rather significant. We had available at that time equipment to apply relatively small amounts of oily materials to the surface of equipment, so we tried applying thin films of oily materials to the surfaces of the drum before the paper was cast on it. That would be between this limiting location for complete crack-off, and the roll pressing station.

We were unable to achieve a result there that gave us commercial cast paper. So we then tried putting large amounts of oil in the coatings themselves.

The experience we then met was this, that we would start out and were able to have commercial freedom from sticking, but the gloss on the paper went down and down and down until it was below a point that was considered acceptable, at which stage we would have to take and laboriously clean all the grease or oil off this drum.

Then we finally hit on the idea of controlling the quantity in there so that it neither stuck at the one horn of the dilemma nor came off too quickly and was commercially too low finish to be useable.

Q. And this application that is here before the Court is an application on that procedure you finally hit upon that solves your problem, is that correct? A. That is correct.

Q. You are aware that certain claims have been allowed in this application which are limited to an amount of oil in the coating of less than one per cent? A. Yes.

Q. In your commercial operations do you use more than one per cent of oil? A. Not at present.

Q. Well, is one per cent of oil the maximum amount that can be used in the coating and still satisfactorily carry out the process described in the application? A. No.

Q. What are some of the variables in the coating process which affect the amount of oil that can be used without adversely affecting the operation? A. There are a great many, and they are inter-related. Without attempting to place them in order of importance, the actual material used as the oil is one of the most important things. There are degrees of effectiveness in oil. Some are very effective, some are relatively ineffective.

The next point is the type of casting surface. We have on commercial or semi-commercial scale used casting surfaces of stainless steel, rolled nickel, electrolytically-formed nickel, and chromium. They all have a different requirement for the amount of oil to insure satisfactory operation. In the laboratory we have used other materials. For example, glass. That is widely different in the amount of oil it requires.

The next, probably most important point, is what is called the p^h. That is the activity of the alkali or acid present. We in our commercial operations now use ammonia, and in that case it is roughly parallel to the amount of ammonia present.

Another very important point is the choice of the alkali used. In our commercial operation when we have used sodium hydroxide in place of ammonia, we have had to use over one per cent to make this operation work, make the commercial paper.

The next point would be the temperature of the drum. The effectiveness of these films is quite different at high and low temperature.

The time allowed to crack off—in other words, the speed at which you desire to run—and the diameter of the equipment available, the length of the casting surface available is an important variable.

The physical state in which you add this oil is a factor. In other words, the degree of emulsification, how finely that is divided, is a factor.

The raw stock used is a factor. In other words, we commonly use a raw stock which has a base coat on it before the top coat is applied. The reason for that is to get uniform absorption of our coating into the sheet just as we later expect to get uniform absorption of ink into the coating. And, using a stock without that coating, the film-forming properties appear quite different.

The other two factors on the raw stock that seem very important are the actual moisture in the sheet at the time it is pressed under this press roll. That, we believe, is effective, since the wetter it is, the wider it is, and the greater the tendency to shrink as it gets on to the dry side.

And another factor, which is related to that: Paper varies greatly in its tendency to shrink as you change moisture in that, so that that would be another factor in the raw stock.

The different pigments have different requirements in amount of film to permit commercial take-off. The things, the ones we use most commonly are finely-divided white clays and a finely-precipitated calcium carbonate. But those are different. There is quite a difference between those two. The weight of coating used is a relatively minor factor but does exert some influence.

Q. I notice you referred to the film. Do you mean the oil on the drum is a film? A. That is our belief, yes, sir.

Q. Have you made any attempts to measure the thickness of that film? A. Yes, we have made some. We have not ever gotten any positive results from those measurements, however. You cannot see it.

Q. Can you detect it in any way on the drum? For example, rubbing the drum with a clean white cloth, would that show any evidence of oil on the cloth? A. The clean white cloth in rubbing a drum does not. That is, when a drum is in satisfactory operating condition a clean cloth does not show any of this film. The evidence that it is there is somewhat more elusive. There are two things that make us believe it is there. First, indirect evidence that if we take a sheet and start casting, where we add more than our commercial amount of these oils the film appears to build up in that, the sheet gets lower and lower finish and separates earlier and earlier. If at that time we change and put a coating in which has less than the proper amount of oil, the operation reverses, as though the film were getting thinner, the crack-off becomes slower and slower and slower, the finish gets higher and higher, and finally it sticks.

Concededly, those are indirect bits of evidence. On a more direct approach, if we take a casting surface which is operating satisfactorily and clean that by techniques which are intended to remove any oil from these surfaces, and they are rather tightly bonded sometimes—such as treating it with a detergent of alcholic potash, which is a very effective one; we have also taken them off with anodic and cathodic electrolytic cleaning to remove any material from the drum.

Now, with a casting surface in that condition we attempt to make a sheet with a normal amount of oil, it sticks tight, just completely stuck, whereas, if you attempt to take that same surface and either lightly flood it with oil and then wipe it off without an abrasive being needed, or start with an extremely high oil content in the coating, you can get started and then can proceed down to the normal amounts of oil.

Q. Could you manufacture cast-coated paper, such as is exemplified by this exhibit, according to your process by using more than one per cent of oil? A. It is my opinion that we could, based on laboratory results, a number of which where we have successfully made sheets with well over one per cent, and some commercial experience where we have been slightly over one per cent.

Q. That is, by selection of these variable factors that you enumerated you could select conditions which would require more than one per cent of oil to carry out the process, is that correct? A. That is correct.

Q. But according to your commercial procedure, it is less than one per cent because more than that is not necessary, is that correct? A. That is correct.

Q. Could you carry out this process as a continuous manufacturing operation without using oil in the coating? A. With our set-up as we have it, no.

Q. Are you familiar with the language of the claim which we are here trying to get? I will read it to you:

> "* * * the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent."

The Court: Which were you reading from?

Mr. Morton: 31, the last part.

By Mr. Morton:

Q. In your opinion does that language which I have just read sufficiently inform one skilled in the art of making coated paper—

Mr. Miller: I object, Your Honor. I think that is a point the Court has to decide.

The Court: You had not finished your question, had you?

Mr. Morton: I was going to ask him his opinion from the standpoint of one skilled in this art, whether that language conveyed to him the necessary information to properly carry out the process, which I think is a pertinent and proper question for an expert speaking from the position of his experience in the art. In other words, what does it mean to him.

The Court: I will over-rule the objection.

By Mr. Morton:

Q. You may answer. A. In my opinion it does convey sufficient description.

Q. How do you, as a matter of practice when you modify your coating composition in one way or another, determine what is the proper amount of oil for the new composition? A. That really falls in two steps. If we are starting with a new, with anything radically changed, a new casting surface, a new coating, or new set-up of requirements, we proceed on a laboratory scale. Normally we will take the coating, which we think would be indicated for the particular requirements, will add a large excess of the oil which we think we will use, and then work down progressively in quantities on a laboratory scale until we get the correct range which appears operable. Having reached that stage, we then take the second step, which is the one we use in our regular coatings. The choice of coating material and stock selected is started over one of these machines. The operators slowly increase the speed until the crack-off becomes visible. In other words, over on this side. This part is quite visible to the operator in the structure as we have it, and he runs until it is coming off at that place.

If that speed is satisfactory to him, the next thing is to examine the paper that is coming off, and to see if the finish is satisfactory. If the finish is too low, he presumably has too much oil. He automatically will go back and add coating with less oil to reduce the oil content in there, and by working either to raise oil on the one extreme, if it is sticking too tight, or decrease oil if it is coming off too easy, he works to a compromise which is suitable from the speed that he wants and the finish that is desired.

Q. Would it be correct to say that in your commercial operation you do adjust the proportion of the film-forming oil in the coating composition that in continued operation the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent? A. That is correct.

Q. Does this cast-coated paper command a higher price than the high-gloss enamel paper of which we offered a sample? A. It does.

Q. About what is your present production of cast-coated paper? A. About 20,000 tons a year.

Q. And that is about what per cent of your total production of coated paper? A. Approximately 20 per cent.

Mr. Morton: That is all.

The Court: Mr. Miller, we will take a five-minute recess.

(Short recess)

Cross Examination by Mr. Miller:

Q. Mr. Montgomery, you were testifying as to the carrying out of the process of your application in connection with apparatus such as diagrammatically set out in Plaintiff's Exhibit No. 5. You testified, did you not, that in this little pan labeled "Coating Material" you added oil? A. During the start-up.

Q. Only during the start-up? A. The testimony was that during start-up we added a large excess there, that the coating normally contains a smaller quantity, which on further testimony was brought out normally is with less than one per cent.

Q. Then you do put oil in there in an amount less than one per cent in carrying out the process? A. In the coating that is used, yes.

Q. What is the purpose of this oil? A. To enable us to make commercial paper. In other words, when we use that oil we have our paper released at a stage that it is saleable.

Q. Now, Mr. Montgomery, you were testifying that in your original experiments, looking toward curing defects in the coating, you used a large amount of oil. You testified did you not, that the large amount of oil did not overcome the defects? A. It overcame the sticking but did not overcome the low finish. In fact, it made that worse.

Q. And, Mr. Montgomery, you also testified, did you not, that in starting up this process you use a coating material that has in it a high oil content? A. During the very start-up, that is correct.

Q. And you stated, did you not, that when that high oil content was used, the coated paper was not satisfactory in all respects as compared with what goes through in your normal run? A. That is correct.

Q. Then it is a fact, is it not, Mr. Montgomery, that if you use too much oil you don't get satisfactory paper, and if you use no oil or too little oil you do not get satisfactory paper? A. Correct.

Q. Then it is further a fact, is it not, Mr. Montgomery, that somewhere between those limits of no oil and too much oil, if you use the right amount of oil you get very good coated paper? A. Correct.

Q. And I understood you to testify, did I not, Mr. Montgomery, that between those limits one skilled in the art could find out where the dividing line was as to the proper amount of oil to use? A. That's correct.

Mr. Miller: That is all.

Mr. Morton: I think there is no redirect. I would like, however, to offer as Plaintiff's Exhibit No. 6 a copy of U. S. Patent 1826726. This is a patent that was referred to in the final decision of the Board of Appeals, but a copy was not included in the transcript, so I would like to add that.

The Court: What exhibit number is that?

Mr. Morton: Exhibit 6.

Mr. Miller: No objection.

The Court: It will be received.

(Document referred to was marked Plaintiff's Exhibit No. 6 and received in evidence.)

Mr. Morton: The Plaintiff rests.

Mr. Miller: If Your Honor please, the only thing I wish to offer in evidence on behalf of the Patent Office are Exhibits A, B, and C, which I informally passed up to the Court. That will be all of the evidence on the part of the Patent Office.

The Court: Have you seen these, Mr. Morton?

Mr. Morton: Yes, I have.

The Court: They will be received.

(Documents previously identified as Papers 11, 16, and 18, U. S. Patent Office, were marked Defendant's Exhibits A, B, and C, respectively, and received in evidence.)

Mr. Morton: I have no rebuttal.

Plaintiff's Exhibit 1.

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

To all persons to whom these presents shall come,
Greeting:

To CERTIFY that the annexed is a true copy from the records of this office of the Petition, Specification and Oath, as said; and Papers 11, 16, 17 and 18, in the matter of the

Pending Application of

WILLIAM J. MONTGOMERY,

For March 31, 1942. Serial Number 436,970,

for

Improvement in Coated Paper.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed at the City of Washington, this fifteenth day of November , in the year of our Lord one thousand nine hundred and forty-nine and of the Independence of the United States of America the one hundred and seventy-fourth.

LAWRENCE C. KINGSLAND
Commissioner of Patents.

ATTEST:

(Illegible)
Chief of Division.

Plaintiff's Exhibit 1.

Mail Division

Mar 31 1942

U. S. Patent Office

PETITION

To the Commissioner of Patents:

Your petitioner, William J. Mongomery, a citizen of the United States residing at Hamilton in the County of Butler State of Ohio whose Post Office address is c/o Champion Paper and Fibre Company Hamilton, Ohio prays that Letters Patent may be granted to him for improvements in Coated Paper as set forth in the annexed specification.

And he hereby appoints William H. Davis, Dean S. Edmonds, Frank E. Barrows, W. Brown Morton, Merton W. Sage, Willis H. Taylor, Jr., Ernest H. Merchant, George E. Middleton, Morris D. Jackson, R. Morton Adams, Raymond F. Adams, Leslie B. Young, Daniel V. Mahoney (constituting the firm of Pennie, Davis, Marvin & Edmonds, 247 Park Avenue, New York City, Registration No. 10839) and each of them, his Attorneys, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to sign the drawings, to receive the Patent, and to transact all business in the Patent Office connected therewith.

William J. Montgomery

Plaintiff's Exhibit 1.

SPECIFICATION

To All Whom It May Concern:

Be It Known, that I, William J. Montgomery, a citizen of the United States residing at Hamilton in the County of Butler State of Ohio have invented certain new and useful improvements in Coated Paper and I do hereby declare the following to be a full, clear and exact description of the invention, such as will enable others skilled in the art to which it appertains, to make and use the same:

The present invention relates to the manufacture of cast surfaced coated paper and is primarily designed as an improvement on the process disclosed in patent No. 1,719,166 issued to Bradner on July 2, 1929.

In accordance with one embodiment of Bradner's invention a web of paper with a layer of an aqueous fluid coating composition comprising pigment and adhesive is pressed against a smooth or polished casting surface. Substantially all of the aqueous vehicle is evaporated from the coating and the coated paper is thereafter stripped from the casting surface, in a finished form, requiring no calendering or other finishing treatment to be ready for use as a base for fine printing or for other purposes. The surface of coated paper made by that process is a substantial replica of the casting surface, and such papers have been found to possess a more attractive finish and a much higher gloss than the previously known coated printing papers.

In the commercial practice of that process some difficulties have been experienced. One of the most serious of these has been the tendency, which was sometimes encountered, of the coating to stick to the casting surface, even after complete drying. Even though the areas which stuck were relatively very small, the trouble was none the less serious, because bits of the coating were pulled out, leaving a defect in the paper surface. These bits of coating remained on the casting surface, producing defects at successive intervals along the coated web. Furthermore, when areas of any material size were involved, the paper was frequently split or torn when being stripped from the casting surface.

The primary object of the present invention is to provide improvements in the process of making cast coated paper to make possible the clean, complete, and uniform stripping of the dried web from the casting surface without deleteriously affecting the gloss on the finished paper. An allied object is to provide a method of accomplishing the above named results which shall be simple, economical, and easy to control. Other and more detailed objects of the invention will become apparent in the following description.

I have discovered that if a casting surface is covered with a thin film of oil the tendency of the coating to stick to the casting surface is eliminated, but the use of such a film causes a serious dulling of the finish, due probably to the weakening of the adhesion of the coating to the casting surface so that the paper was not held firmly in place during the drying operation and the finish of the casting surface was not imparted to the coating. Various thicknesses of oil films were applied, down to the thinnest possible obtained by any known apparatus for continuous application of oil to the surface, but in all cases the finish of the coating was so seriously impaired as to more than offset any advantage derived from the elimination of the tendency of the coating to stick to the casting surface. In the course of my experiments I have further discovered that if a film of oil is initially applied to the casting surface and the surface then used repeatedly without replenishing the oil film,

Plaintiff's Exhibit 1.

the impairment of the gloss due to the oil film gradually decreases until, before sticking again occurs, the impairment of gloss disappears and a true cast coat is obtained on the paper. This is thought to be due to a progressive depletion of the oil film and concomitant reduction in its tendency to prevent adherence between the wet coating material and the casting surface, until a degree of thinness is reached which permits firm adherence until the coating material is substantially completely dry (i.e. until it has been reduced to the commercial range of moisture content for coated printing paper), and then serves to prevent further adherence. At this stage a true cast surfaced coated paper results in which the coating surface reproduces even the microscopic features of the surface conformation of the casting surface.

As the use of the surface is continued the oil film is gradually destroyed and the stage is soon reached where the tendency of the coating to stick once more appears. For a short period, however, in this repeated use of the casting surface without replenishing the oil film, the finish of the surface is unimpaired and at the same time the tendency of the coating to stick is eliminated.

Many methods of film formation and deposition were tried in an effort to maintain an oil film of a thickness within this desired range, but none proved adequate for the deposition or maintenance of a film of such infinitesimal thinness. I have, however, further discovered that if, instead of attempting to apply oil directly to the casting surface, oil is incorporated into the aqueous fluid coating material, this alone will serve to maintain the oil film on the casting surface. It may be that this serves to prevent oil from the film being carried away by the coating on the finished paper, but it seems more probable that a point of equilibrium is reached where absorption of oil from the fluid coating material onto the casting surface balances the absorption of oil from the film into the coating which is carried away with the paper. I have still further discovered that by properly regulating the amount of oil incorporated into the coating material I can control the thickness of the film so that the desired results can be continuously secured.

It may be noted that the actual thickness of the required film is completely unknown and it may vary considerably with different oils. The thickness is infinitesimal as the casting surface is clean and oil-free both in appearance and as judged by the common tests for the presence of oil. It is known to be materially less than the wave length of light, since diffraction colors disappear from the film long before the necessary thinness is reached. It is thought that the film may be of mono-molecular thickness since in use it does not appear to behave as a fluid, but this is wholly speculative. The only gauge of its thickness and the only convenient proof of its presence is, in this case, the result obtained. If the coated paper loosens from the casting surface before the coating has adequately dried and set, the paper presents a dull surface which does not faithfully reproduce the casting surface. This means that the proportion of oil in the coating is too high and that presumably the film is too thick. If, on the other hand, the coated paper tends to stick to the casting surface after the drying has been completed, it means (assuming the casting surface to be clean and otherwise properly prepared) that the proportion of oil in the coating material is too low and that presumably the thickness or continuity of the film is inadequate. Thus in practical operation the oil content of the coating is adjusted in accordance with the results obtained without regard to any theoretical consideration as to the presence or thickness of a film on the casting surface.

The term "oil" as used herein may include not only the unctuous water-insoluble liquids, usually classed as oils,

Plaintiff's Exhibit 1.

but also such materials as hydrogenated vegetable oils which may be solid at room temperatures but liquid at operating temperatures, sulphonated vegetable oils (which however may perhaps owe their effectiveness to the unsulphonated portion of the oil), as well as other insoluble liquids not commonly classed as oils in the narrow sense of the term, such as for example tributyl phosphate, xylene, turpentine, monochlorbenzene, etc. So far as I know, any water-insoluble liquid which will wet the casting surface and spread into a continuous film yet does not vaporize too readily at the operating temperatures (which are chosen to suit the particular conditions and are usually between 130 and 210° F.), will serve the purpose. For obvious reasons colorless, odorless oils are particularly desirable although the amount required is usually so small that color and odor in the oil, unless quite pronounced, may not be objectionable. I find sulphonated castor oil to be quite satisfactory for use in many coatings. Tall oil, a by-product of the sulphate pulping process, has been found to have a peculiar effectiveness for use in the present process.

As is well known, the casein of commerce contains greater or lesser amounts of butter fat as an impurity. Consequently when using coating compositions containing casein as an adhesive, the amount of butter fat present in the casein should be considered in adjusting the oil content of the coating.

It is desirable before starting to use an oil-containing coating, to make certain that the casting surface is either wet or wettable with the oil being used. If the surface is not known to be in this condition it may be wetted by rubbing, prior to putting it into service, either with the oil used in the coating or with another oil or other film-forming material readily miscible therewith. This operation may advantageously be combined with the polishing or buffing operation, by which the desired mirror finish is given to the surface, by admixing the oil with the polishing agent. In case of surfaces not readily wet with oil, the wetting with, and the proper spreading of, the oil may be facilitated by first applying a layer of a soap to the surface. This may be accomplished by any desired method but may also be conveniently combined with the polishing or buffing operation. Magnesium oleate or other insoluble soap of an alkaline earth metal may be used, as well as soluble soaps such as ammonium stearate, etc. The application of both soap and oil film may be advantageously accomplished simultaneously in combination with the polishing operation by admixing both the oil and the soap with the polishing agent. After polishing, the surface may be wiped clean to remove the polishing compound together with the metal and foreign matter loosened by the polishing operation, since the film, once established on the metal surface, will not be broken down by the wiping operation.

The process and its application will be more clearly understood by reference to the following examples which have been found to work successfully in practice.

Example 1

Coating material was prepared by thoroughly mixing 75 parts by weight of finely divided precipitated calcium carbonate, 25 parts of finely classified china clay, and 25 parts of water, with 12 parts, dry weight, of casein dissolved in ammonia water. One-eighth part of sulphonated castor oil and 1/20 part tributyl phosphate were then stirred in and the preparation of the coating material was completed by thoroughly mixing with additional water sufficient to bring the whole to approximately 50 per cent solids. The casting surface, which in this case was an internally heated, chromium surfaced, rotating cylinder, was prepared before use by polishing and rubbing down with a lapping compound suspended in mineral oil, and wiping clean with a soft cloth.

Plaintiff's Exhibit 1.

The paper web was a conventional coating stock, of suitable width, and weighing about 43 pounds per ream (500 sheets 25 x 38 inches). The coating composition was applied to one side of the paper in excess of the amount required and the paper was pressed against the finishing surface squeezing off the excess coating and leaving approximately 12 pounds per ream, dry weight. The operation was continuous and the oil film on the casting surface soon reached a condition of equilibrium with the oil content of the coating material. From that point on the operation was uniform. The coated paper adhered to the casting surface until substantially completely dry and was then readily and completely stripped therefrom. The finished paper had a truly typical cast surface with a gloss of 85 as measured by the Bausch and Lomb glossmeter.

Example 2

The coating material was prepared as in Example 1 except that 100 parts of calcium carbonate were used in place of the carbonate-clay mixture. Twelve parts of an extremely finely divided colored pigment were added prior to final mixing to give color to the finished product, along with 10 parts additional casein in 25 per cent ammoniacal solution and 1/4 part (instead of 1/8 part) of sulphonated castor oil. Before operations were started, the chromium casting surface was prepared by polishing and buffing with a polishing agent mixed with 3 parts castor oil and 1 part sulphonated castor oil, and then wiping the surface clean with a soft cloth. The finished coated paper was a beautifully colored typically cast coated product faithfully reproducing the surface smoothness of the casting surface, and having a Bausch and Lomb gloss of 98 per cent.

Example 3

In this case the coating was similar to that in Example 1, except that 100 parts of calcium carbonate were again used in place of the carbonate-clay mixture, and 15 parts instead of 12 parts of casein were used, the sulphonated castor oil was omitted and 1/2 part of mineral oil (American White Oil) was used in its stead. The casting surface was in this case of highly polished nickel instead of chromium. Before use, this surface was prepared by buffing with an abrasive polishing agent suspended in an emulsion made up of 80 parts water, 20 parts stearic acid, 7 parts of 28% ammonia solution, and 20 parts of mineral oil (the same as incorporated in the coating). A high quality of true cast coated paper resulted, which when dry came off of the casting surface with no sign of sticking.

Example 4

In this case a coating composition similar to that in Example 1 was used. It consisted of 75 parts of finely precipitated calcium carbonate, 25 parts of coating clay, 15 parts of casein dispersed by ammonia water, 1/4 part of sulphonated castor oil, and 1/4 part of castor oil, with sufficient water to give a solids content of about 52 per cent. The paper stock used as a base for the coating was made of a bleached chemical wood pulp carrying a thin coating of mineral pigment and adhesive applied thereto on the paper-making machine on which the paper web was produced. The casting surface was in the form of an endless belt having a surface of polished nickel. After drying, the coated paper, carrying about 10 pounds per ream, dry weight, of coating and travelling at a speed of approximately 275 feet per minute, was readily and completely removed from the casting surface and was found to possess a very high finish, truly reproducing even the minute characteristics of the polished casting surface.

Example 5

The coating in this case was made up of 100 parts finely precipitated calcium carbonate, 12 parts casein (dry weight) dissolved in ammonia water, to which was added 1/10 part tall oil in ammonia water. The casting surface was in the form of an endless belt having a surface of polished nickel. Prior to starting operations this surface was buffed using a commercial buffing compound of rouge and tallow. The coating and casting operations were carried on at a speed of about 300 feet per minute. Coated paper having an excellent cast surface was obtained and there appeared to be no tendency of the dried paper to stick to the casting surface.

Example 6

The coating in this case was made up of 100 parts of finely precipitated calcium carbonate, 17 parts of casein, with 1/10 part of tributyl phosphate. The casting surface was the same as in Example 5 but the buffing was done with a compound made up of 80 parts water, 20 parts stearic acid, 7 parts of 28% ammonia solution, 20 parts of tributyl phosphate, and an abrasive polishing agent. No tendency towards sticking was observed and the product possessed a true cast surface of excellent quality.

Example 7

The coating used in this case was composed of 100 parts of finely precipitated calcium carbonate, 12 parts of casein (dry weight) dissolved in ammonia water, 3/4 part of sulphonated castor oil neutralized with ammonia, together with sufficient water to bring the whole to 56 per cent total solids. The casting surface was, in this case, of stainless steel and in the form of an endless belt. It was prepared, prior to use, by buffing with a compound made up of levigated alumina suspended in mineral oil. About 12 pounds (dry weight) of this coating per ream were applied to the paper stock in the usual manner, at a speed of about 150 linear feet per minute. The dried coated paper came off of the casting surface without sticking and possessed the characteristic appearance of true cast surfaced coated paper.

Example 8

In this case the coating was composed of 100 parts of finely precipitated calcium carbonate with 30 parts (dry weight) of starch, and about 3/4 part sulphonated castor oil neutralized with ammonia, with enough water to bring the whole to about 60 per cent total solids. The casting surface was of polished nickel which had been prepared, prior to use, by buffing with a polishing agent in a fatty acid. The paper coated and dried on the casting surface in the usual manner showed no sign of sticking and gave a true cast surfaced coated paper, though the same coating without the oil showed serious sticking to the same surface prepared in the same manner.

It will be understood, of course, that the above examples are typical of the various formulae which have been found useful in practice and that the invention is in nowise limited to such specific procedures except insofar as expressed in the appended claims.

This application is a continuation in part of my copending application Ser. No. 351,218, filed August 3, 1940.

I claim:

26. The process of manufacturing cast surfaced coated paper which consists in applying to a web of paper a layer of aqueous fluid coating material comprising insoluble filler, adhesive, and oil in an amount in the order of one-tenth to one percent of the weight of the coating composition, dry basis, and drying said coating in contact with a casting surface, the amount of said oil being such as to maintain on said casting surface, by adsorption thereon,

a film of oil of a thickness insufficient to prevent adhesion of the coating composition to the casting surface until the coating composition is substantially dry.

27. The process of claim 26 wherein the casting surface is given a preliminary application of oil to prevent initial sticking of the coating to the casting surface.

28. The method of claim 26 in which the oil used in the coating material is sulphonated castor oil.

29. The method of claim 26 in which the oil used in the coating material is tall oil.

30. The method of claim 26 in which the oil used in the coating material is tributyl phosphate.

31. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it adheres to said casting surface; and thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.

32. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing

Plaintiff's Exhibit 1.

the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it is in contact with said casting surface; and thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, treating the casting surface to render it suitably wettable with said film-forming oil, and so adjusting the proportion of film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.

33. The improvement in the process of making cast surfaced coated paper as set forth in claim 32, wherein the treatment of the casting surface comprises the application thereto of a film of soap prior to the operation of pressing the wet coated side of the paper thereon.

In Testimony Whereof I affix my signature.

William J. Montgomery

Plaintiff's Exhibit 1.

OATH

State of Ohio } ss.:
County of Butler }

I, William J. Montgomery, the above-named petitioner, being duly sworn, depose and say that I am a citizen of the United States and a resident of Hamilton, Butler County, Ohio, and that I verily believe myself to be the original, first and sole inventor of the improvements in

COATED PAPER

described and claimed in the annexed specifications; that I do not know and do not believe that the same was ever known or used before my invention or discovery thereof, or patented or described in any printed publication in any country before my invention or discovery thereof; that I do not know and do not believe that the subject of this application, not disclosed in my prior pending application, serial No. 351,218, filed August 3, 1940, was patented or described in any printed publication in any country more than one year prior to this application or in public use or on sale in the United States for more than one year prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said improvements has been filed by me or my representatives or assigns in any country foreign to the United States.

William J. Montgomery

Subscribed and sworn to before me this 27 day of March 1942.

Scott Zoller
Scott Zoller, Notary Public
My Commission Expires June 11, 1943

(Seal)

Plaintiff's Exhibit 1.

Div. 38
Rm. 275
DHS :lws

Paper No. 11

MAILED
Sep. 20 1944

DEPARTMENT OF COMMERCE

UNITED STATES PATENT OFFICE

RICHMOND, VIRGINIA

In Re Application of
William J. Montgomery,
Serial No. 436970
Filed: Mar. 31, 1942
For: COATED PAPER

BEFORE THE BOARD OF APPEALS ON APPEAL

Pennie, Davis, Marvin & Edmonds, Attys.

EXAMINER'S STATEMENT

Applicant has appealed from the final rejection of claims 31 to 33 found immediately below. Claims 26 to 30, the only other claims in this application, have been allowed.

> 31. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it adheres to said casting surface; and thereafter removing the coated paper therefrom; the improvement which comprises incorporating in the coating composition prior

to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.

32. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it is in contact with said casting surface; and thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, treating the casting surface to render it suitably wettable with said film-forming oil, and so adjusting the proportion of film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.

33. The improvement in the process of making cast surfaced coated paper as set forth in claim 32, wherein the treatment of the casting surface comprises the application thereto of a film of soap prior to the operation of pressing the wet coated side of the paper thereon.

The invention relates to an improvement in the method of applying a cast surface coating to paper. The idea of applying cast surface coatings to paper is old as exemplified by patent 1,826,726 to Bradner. Applicant's improvement resides in adding a small amount of oil to the coating composition.

No reference is relied upon.

Claims 31 to 33 were rejected as being vague and indefinite.

Applicant has disclosed that the amount of oil employed is critical. It is not thought that the expression "so adjusting the proportion of said film-forming oil in the coating composition that * * *" particularly points out and distinctly claims the invention as required by the statute. In re Duggan 1942 C. D. 209 held that "the strength and temperature of said baths and the time of treatment being so adjusted that substantial solubilizing of the fiber is avoided" did not distinctly claim the invention to comply with the statute. In re Stack 479 O. G. 997 held that "increasing the silver in the outer portion sufficiently to produce an amalgam with the desired expansibility" was a mere statement of the problem and not sufficiently definite for patentability.

Respectfully submitted,

C. F. Krafft,
Examiner—Division 38.

Plaintiff's Exhibit 1.

Appeal No. 2,999 MAILED Paper No. 16

Hearing: Nov. 8-1945

September 18, 1945 DB

U. S. PATENT OFFICE
BOARD OF APPEALS

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte William J. Montgomery

Application for Patent filed March 31, 1942, Serial No. 436,970. Coated Paper.

Pennie, Davis, Marvin & Edmonds for appellant.

This is an appeal from the final rejection of claims 31 to 33 inclusive.

Claim 31 is illustrative:

31. In the process of making cast surfaced coated paper by applying fluid aqueous coating composition comprising adhesive and insoluble filler to a web of paper; pressing the coated surface of the paper, before the coating thereon has reached a non-plastic condition, against a finished casting surface to which it is adherent; drying the coated surface of the paper to a substantially non-plastic condition while it adheres to said casting surface; and

thereafter removing the coated paper therefrom: the improvement which comprises incorporating in the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent.

No art is cited against the claims.

The appealed claims relate to a method of producing a cast surfaced coated paper. The nature of the method will be understood from a reading of the claims. The method is acknowledged in the specification to be generally old as shown in patent No. 1,719,166 to Bradner. The point of novelty over the known method consists in adding a small quantity of oil to the coating composition before it is applied to the paper. The quantity is critical because if too much oil is added to the coating material the coating will separate from the casting surface before it has sufficiently dried and set. On the other hand, if the quantity of oil is too small, the coating will stick to the casting surface. The examiner has allowed five claims in which the quantity of oil is specified.

The appealed claims stand rejected as not pointing out the inventive novelty with the degree of distinctness and particularly required by the statute. The examiner cites In re Duggan, et al., 1942 C.D. 209; 29 C.C.P.A. 765; 124 F (2d) 215, and In re Stack 1937 C.D. 230; 24 C.C.P.A. 836; 87 F (2d) 210, in support of his position. These decisions clearly hold that a method claim should do more than merely state a broad conception of a problem to be solved or the result to be accomplished. It seems to us that the appealed claims present a situation where the step of "adjusting the proportion of film-forming oil" is dependent upon the result desired to be obtained rather than the result being dependent upon the step. We agree with the examiner that the claims fail to point out the invention with the distinctness contemplated by R.S. 4888.

Applicant cites the case of Minerals Separation v. Hyde, 242, U.S. 261, as basis for the proposition that a patented claim is not invalid because preliminary tests must be made in order to determine the amount of an ingredient that should be used in order to obtain the best results. The printed report of this case does not include a copy of the claims in controversy so that we are unable to compare them with the claims here before us. However, it would appear from the opinion that the only claims held valid by the Court were those which included the specific proportions of oil said to be critical. We do not consider the Minerals Separation case controlling as to the claims involved in this appeal.

The decision of the examiner is affirmed.

C. H. Shaffer Examiner-in-Chief	BOARD OF APPEALS
E. F. Klinge Examiner-in-Chief	
Mark Taylor. Examiner-in-Chief	

November 8, 1945

Pennie, Davis, Marvin & Edmonds,
247 Park Avenue,
New York, N.Y.

Plaintiff's Exhibit 1.

IN THE UNITED STATES PATENT OFFICE

Board of Appeals
Nov 28 1945
U. S. Patent Office

In re application of
William J. Montgomery
Serial Number 436,970
Filed March 31, 1942
For: Coated Paper

Honorable Commissioner of Patents
Washington, D. C.

Petition for Rehearing

Sir:

The applicant prays for a rehearing in the above-entitled case for the reason that it is believed from the decision that he did not in his former argument sufficiently explain the invention for the exact parallel facts in this case and those in the case of Minerals Separation v. Hyde, 242 U. S. 261 to be clear. No art was cited in the case at bar for the reason that the applicant is the first to incorporate in a paper coating composition used in making cast surfaced coated paper a film-forming oil in any quantity. As far as novelty is concerned, the claims, taking claim 31 as illustrative, would sufficiently distinguish from the prior art if the last clause beginning "and so adjusting the proportion" etc., were omitted altogether. The limitation embodied in this last clause of the claim is not for the purpose of distinguishing from the prior art but merely to exclude from the claim the use of oil in such amounts, both too much and too little, that the desired result is not attained.

Plaintiff's Exhibit 1.

In the Minerals Separation case the patentee was not the first to broadly use oil in an ore separation process. Consequently in order to distinguish from the prior art, the claims were limited to a fraction of 1%. In the prior flotation processes oil has been used in greater amounts than 1% to float the particles by the buoyancy of the adhering oil. Hence, in order for the claims to exclude the prior art, the limitation to a fraction of 1% was included. This limitation, however, did not in any way define the critical amount of oil required. A fraction of 1% would include anything from 99/100 down, and with some ores the critical amount of oil would be two or three hundredths of 1%. In the process covered by the suit in the Minerals Separation case, the amount of oil is critical but varies for each particular oil and each particular ore. In applicant's process the amount of oil is critical but varies with the particular coating composition and with each particular oil, and also with the degree of agitation employed in mixing the coating. Hence, in any attempt to define the critical amount of oil in a patent claim by a quantitative statement would require also a quantitative statement of the ingredients of the coating composition, of the nature of the oil, and also of the degree of agitation employed in mixing the coating composition. In the Minerals Separation case, the Supreme Court recognized that the critical quantity of oil could not be numerically defined in the patent claims and, therefore, held that without such limitation the claims were not indefinite, although it was necessary for the user of the process to determine by experimentation the amount of oil to be used for each particular ore with which the process was used.

In the case at bar the specification contains several specific examples employing coating compositions widely used in the art so that the user of the process may, without experimentation of any kind, produce a number of the more popular types of paper. However, if the user desires to extend the use of the process beyond these specific examples, a certain amount of experimentation to get the optimum results may be necessary. The necessity of such experimentation, however, does not, according to the doctrine established in the Minerals Separation case, render the claim indefinite.

The claims in the Minerals Separation case present an exact parallel with the claims here if it is to be borne in mind that the limitation to a fraction of 1% of oil is not a definition of a critical amount of oil, but a limitation to avoid anticipation by the old process wherein sufficient oil was added to oil-coat the particles. See, for example, claim 2:

> 2. The herein-described process of concentrating ores which consists in mixing the powdered ore with a slightly-acidified water, adding a small proportion of an oily liquid having a preferential affinity for metalliferous matter (amounting to a fraction of one per cent on the ore), agitating the mixture until the oil-coated mineral matter forms into a froth and separating the froth from the remainder by flotation.

In the cases relied upon by the Board, there is little similarity to the case at bar.

In Re Storch the applicant has invented a new article of manufacture, namely, an alloyed tin and silver for dental use wherein there was a greater concentration of the silver in the surface of the granules than in the interior. In addition to article claims, he had method claims which recited broadly the step of reducing the amount of silver in the surface of the granules without specifying how in one claim, whereas in the other claim the step was defined as reducing the amount of silver by "chemical treatment". The claims were rejected on the ground of being too broad in that they covered all means of producing the novel product.

Plaintiff's Exhibit 1.

The case at bar relates to a new process for making an old article and the novel step is specifically recited in the claim; namely, adding a film-forming oil to the coating composition. The claims here are rejected as indefinite because the amount of oil was not stated in numerical terms. There is no question presented in re Storch of whether a claim is indefinite which does not recite a critical quantity when that quantity varies with variations in other conditions so that it cannot be defined in numerical terms. That issue is raised in the Minerals Separation case, and the defense that the claims were indefinite and uncertain was overruled.

In re Duggan, the entire novelty in the process lay in quantitatively altering the strength and temperature factors in an otherwise old process. In that case the court said (p. 81):

> "It is not meant to suggest that there is anything improper in stating the result in the claims, but we do not think the public may properly be remitted solely to the result, in order to determine what the actual and decisive step or steps may be."

The functional statement was added to the claims here in issue out of abundant caution to avoid a charge that they included amounts of oil which would not serve a useful purpose. The claims without this statement distinguish from the prior art but do not recite the critical amount of oil. This was true also in the Minerals Separation case, and the claims were there sustained as valid and infringed. If this Board regards the claims as allowable without the functional limitation, it is requested that a recommendation to that effect be made to the Primary Examiner.

Respectfully submitted,

Pennie, Davis, Marvin & Edmonds,
Attorneys for the Applicant.

Washington, D. C.

Plaintiff's Exhibit 1.

Appeal No. 2,999 MAILED Paper No. 18

DEC 17 1945

DB

U. S. PATENT OFFICE

BOARD OF APPEALS

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex Parte William J. Montgomery

Application for Patent filed March 31, 1942,
Serial No. 436,970. Coated Paper.

Pennie, Davis, Marvin & Edmonds for appellant.

ON PETITION FOR RECONSIDERATION

The paper filed November 28, 1945 entitled "Petition for Rehearing" will be treated as a petition for reconsideration but in accordance with our customary practice no oral rehearing will be granted.

Plaintiff's Exhibit 1.

In our former decision dated November 8, 1945, we commented that in the case of Minerals Separation v. Hyde, 242 U.S. 261, the only claims held valid by the Court were those which included the specific proportions of oil said to be critical. Applicant, in his request for rehearing, states that in the Minerals Separation v. Hyde case the reasons why the Court refused to hold valid claims which omitted the critical proportions of oil was because the patentee was not the first to use oil in an ore separation process and the specific proportions of oil were deemed necessary in the claims to distinguish from the prior art. He states that in the instant case the functional limitation recited in the clause reading, "so adjusting, etc.", is not necessary to avoid the prior art. He contends that he is the first one to use oil in a paper coating composition to prevent it from sticking to the casting surface and that the functional clause could be omitted without affecting the patentability of claim 31 and he suggests that this Board recommend allowance of the claim without the clause in question.

A reading of claim 31 reveals that applicant's improvement, as defined in that claim, consists of the single positive step of adding oil to a paper coating composition. Applicant is not the first to add oil to such a composition as the patent to Bradner, 1,826,726, of record shows the adding of oil to a paper coating composition. Therefore, if the functional clause were omitted from claim 31 as suggested by applicant there would be no limitation whatever on the single positive step of adding oil that would serve to distinguish it from the disclosure of Bradner, 1,826,726. For the same reason that a definite proportion of oil was required to be specified in the Minerals Separation v. Hyde case in order to distinguish from the prior art we think that such a definite limitation is required in applicant's case. We have carefully considered applicant's argument but we are of the opinion that our former decision was proper and accordingly no change is made therein.

In event of appeal attention is directed to

In re Boyce 32 CCPA........
144 Fed. (2d) 896
1944 C. D. ....
568 O. G. 568
63 USPQ 80

in regard to specifically including in the appeal notice *all* grounds of rejection in the examiner's statement not expressly overruled by the Board.

C H Shaffer
Examiner-in-Chief

E. F. Klinge
Examiner-in-Chief

Mark Taylor.
Examiner-in-Chief

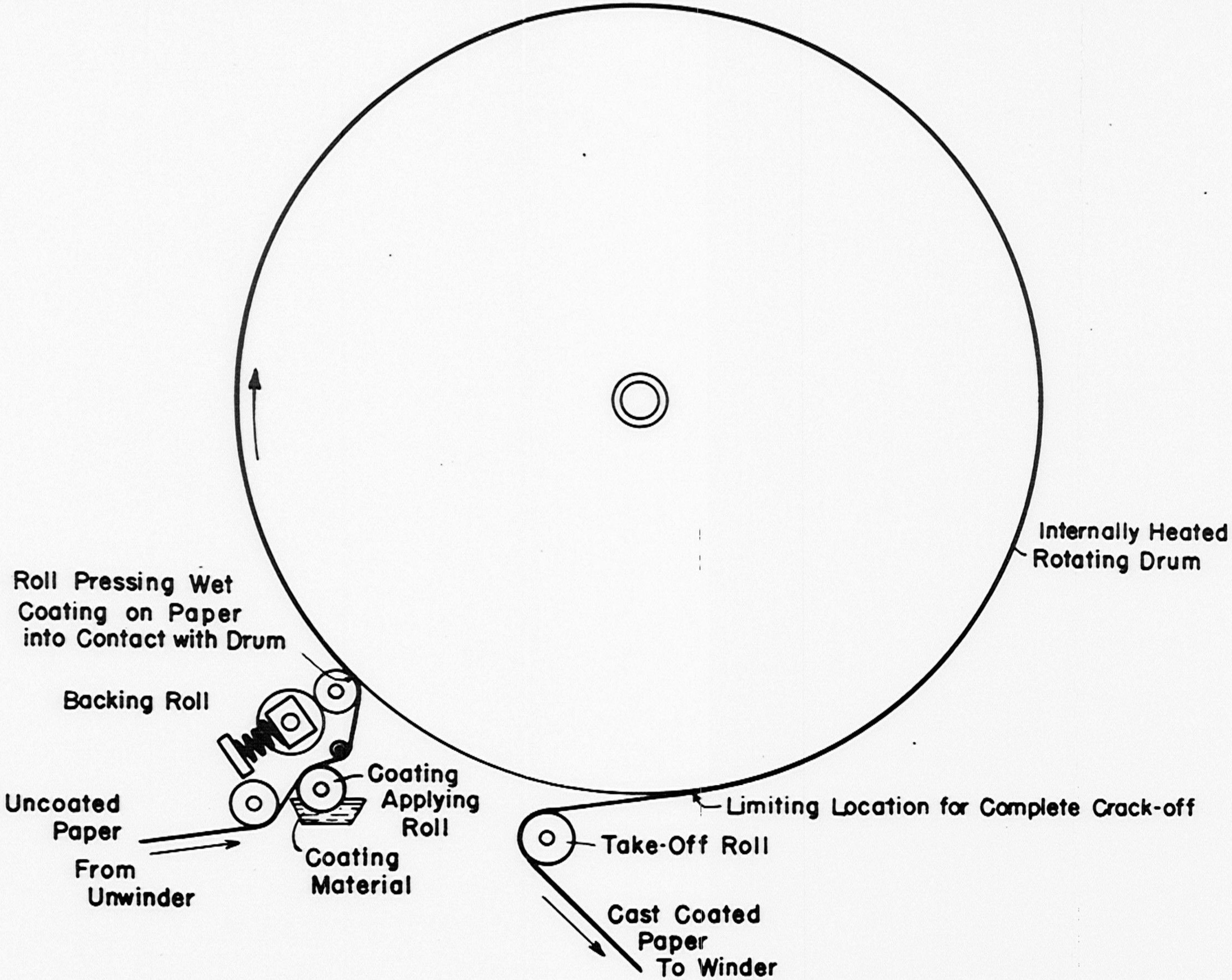
Board
of
Appeals

December 17, 1945

Pennie, Davis, Marvin & Edmonds,
247 Park Avenue,
New York, N.Y.

Plaintiff's Exhibit 5.

(See Opposite ☛)


Internally Heated
Rotating Drum
Roll Pressing Wet
Coating on Paper
into Contact with Drum
Backing Roll
Coating
Applying
Roll
Uncoated
Paper
From
Unwinder
Coating
Material
Limiting Location for Complete Crack-off
Take-Off Roll
Cast Coated
Paper
To Winder

Plaintiff's Exhibit 6.

(See Opposite ☛)

Patented Oct. 13, 1931 **1,826,726**

UNITED STATES PATENT OFFICE

DONALD B. BRADNER, OF HAMILTON, OHIO, ASSIGNOR TO THE CHAMPION COATED PAPER COMPANY, OF HAMILTON, OHIO, A CORPORATION OF OHIO

PAPER COATING COMPOSITION

No Drawing. Application filed August 30, 1928. Serial No. 303,123.

The present invention relates to the art of coating paper and particularly to an improved paper coating composition. By the term "mineral coated paper" is meant paper which has been coated with a composition consisting essentially of at least 70% of a mineral pigment, such as clay, satin white, and the like, and not more than 30% of an adhesive such as starch, casein (that is, a caseinate of an alkali metal or ammonium) and the like dispersed in water, and which after drying and calendering is suitable for high grade printing.

A frequent defect of coated paper is the presence of "pin holes". "Pin holes" is the name given to minute, more or less circular openings in the surface of the coating on coated paper. When they are numerous and large, they are very objectionable, as they greatly impair the printing quality of paper, especially for fine half-tone work, which is one of the chief uses to which coated paper is put. Pin holes are due to the presence of foam in the coating mixture. When the bubbles comprising the foam break after the coating is partially set during the drying operation, they leave holes in the coating which do not flow together. The resulting paper contains pin holes.

Many materials have been proposed from time to time to prevent pin holes, including fusel oil, carbon tetrachloride, etc. These materials, particularly fusel oil, are apparently useful under certain conditions, but they are not always reliable.

It has been found that small quantities of pine oil are very effective in preventing pin holes. Pine oil is cheap, harmless and reliable. It may be added directly to the coating mixture during the process of manufacture or it may be added to the coating mixture just prior to its application to the paper.

Only a very small amount of pine oil is ordinarily required. For example, one to two pints of pine oil in 300 gallons of coating mixture suffices for all ordinary paper coating mixtures. In case of particularly foamy coatings, the quantity of pine oil may be increased to three or four times the normal amount. The quantity of pine oil required even in extreme cases is less than the quantity of fusel oil required, and in addition the pine oil is considerably cheaper.

Coated paper is subject to another defect known as "grease". "Grease" in coated paper refers to transparent spots in the coating. One cause of this defect seems to be the failure of the coating mixture to wet the paper in all places.

One of the chief difficulties encountered in the use of agents for the prevention of pin holes is the tendency to cause grease when too much of the agent is used. When pine oil is used this difficulty is not as serious as with other agents heretofore used.

It has also been found that mixing pine oil with a "soluble oil" such as sulphonated castor oil gives a mixture which when poured into the coating mixture causes the pine oil to be dispersed in an extremely finely divided state. This gives a much better distribution of the pine oil than is obtained by adding the pine oil alone. Moreover, the mixture of pine oil and sulfonated castor oil appears to have less tendency to form grease than pine oil alone, particularly when the pine oil is added in excessive amounts.

The following example will serve to illustrate the invention:

2 pints of pine oil mixed with 2 pints of sulphonated castor oil were added to 30 gallons of an aqueous coating mixture comprising 200 lbs. of a 60% clay paste and 85 lbs. of a 20% casein solution.

When applied to paper raw stock by the usual methods this composition gave a coating substantially free from pin holes and grease.

I claim:

1. In a process of coating a web of paper with an aqueous mineral coating composition comprising besides an aqueous vehicle mineral pigment in major amount and an adhesive in minor amount, the step of reducing pin hole defects in the resulting coating which consists in dispersing a relatively small but effective amount of pine oil in said composition and coating the paper web with the resulting mixture.

2. A composition for use in making min-

eral coated paper having improved pin hole characteristics, comprising at least 70% of mineral pigment, an adhesive, and a relatively small but effective amount of pine oil, dispersed in water.

3. A composition for use in making mineral coated paper having improved pin hole characteristics, comprising at least 70% of mineral pigment, casein, and a relatively small but effective amount of pine oil, dispersed in water.

In testimony whereof, I affix my signature.

DONALD B. BRADNER.

BRIEF FOR APPELLEE

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

APPEAL NO. 10655

WILLIAM J. MONTGOMERY AND THE CHAMPION PAPER AND FIBRE COMPANY, APPELLANTS

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA

E. L. REYNOLDS,
Solicitor, United States Patent Office,
Attorney for Appellee.

H. S. MILLER,
Of Counsel.

United States Court of Appea
For the
District of Columbia Circuit

FILED SEP 7 - 1950

Joseph W. Stewart
CLERK

STATEMENT OF QUESTION PRESENTED

In the opinion of appellee, the question is whether, in a claim in a patent application for a process of making cast surface coated paper, the alleged invention is defined with sufficient definiteness to meet the requirements of 35 U. S. C. 63, in the language reading, "the improvement which comprises incorporating into the coating composition prior to its application to the paper a film-forming oil, and so adjusting the proportion of said film-forming oil in the coating composition, that, in continued operation, the coating adheres to the casting surface until non-plastic and thereafter upon further drying becomes non-adherent."

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AUTHORITIES CITED

Cases:

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- *Burke Electric Co.* v. *Independent Pneumatic Tool Co.*, 232 Fed. 145 4
- *Caunt, In re*, 23 CCPA 855, 81 F 2d 405 2, 4, 5
- *Chadeloid Chemical Co.* v. *Wilson Remover Co. et al.*, 224 Fed. 481 3
- *Duggan et al., In re*, 29 CCPA 765, 124 F. 2d 215 5
- *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U. S. 45 3
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- *Koebel* v. *Coe*, 70 App. D. C. 261, 105 F. 2d 784 5
- *Minerals Separation, Ltd.* v. *Hyde*, 242 U. S. 261 2, 4
- *Murphy* v. *Coe*, 69 App. D. C. 225, 99 F. 2d 994 5
- *Procter & Gamble* v. *Refining*, 135 F. 2d 900 4
- *Richter, In re*, 19 CCPA 756, 53 F. 2d 525 4

Statute:

- 35 U. S. C. 33 1, 2, 5, 7

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

APPEAL No. 10655

WILLIAM J. MONTGOMERY AND THE CHAMPION PAPER AND FIBRE COMPANY, APPELLANTS

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS, APPELLEE

APPEAL FROM THE JUDGMENT OF THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF COLUMBIA

BRIEF FOR THE COMMISSIONER OF PATENTS

COUNTERSTATEMENT OF THE CASE

While the statement of the case as presented at page 2 of appellants' brief is deemed to be substantially correct, briefly by way of summary, the issue here presented is whether the District Court was right in refusing to allow claims 31, 32 and 33 of appellants' application for patent at bar. The answer to this question depends, in turn, upon the answer to the question hereinbefore set forth under the heading "Statement of Question Presented."

SUMMARY OF ARGUMENT

1. A method claim, to be patentable, should state the steps responsible for the result.

2. None of the cases cited in appellant's brief is pertinent on the precise question here involved.

3. Mere statement of the result in a method claim, without definitely stating the step responsible for the result, does not "particularly point out and distinctly claim" the invention, as required by 35 U. S. C. 33.

4. In the claims at bar, the step of "adjusting the proportion of said film-forming oil * * *" is dependent upon the result desired, rather than the result being dependent upon the step.

5. The claims at bar are vague and indefinite at the precise point of novelty and are not sufficiently definite for patentability.

ARGUMENT

1. It is elemental that a method claim, to be patentable, should state the steps responsible for the result. The District Court so held. (Conclusion of Law 1, Appendix for Appellants, page 8.) In other words, merely to state the result of a step is an insufficient definition of the method. In the case of *In re Caunt,* 23 CCPA 855, 81 F. 2d 405, it was said that "It is not meant to suggest that there is anything improper in stating the result in the claims, but we do not think the public may properly be remitted solely to the result, in order to learn what the actual and decisive step or steps may be."

2. Notwithstanding appellants' arguments to the contrary, as presented at pages 16 to 18 of their brief, the case of *Minerals Separation, Ltd.* v. *Hyde,* 242 U. S. 261, is not any precedent for allowing claims of the character here presented. The claims there in

suit involved the use of oil, but there the similarity ends. Appellants nowhere in their brief show that any claim upheld in suit in the cited case stated the proportion of oil solely by the result alleged to flow from that proportion. On the contrary, reference to the patent in suit, No. 835,120, shows that of the claims held valid by the court, all contained specific limitations on the oil "amounting to a fraction of one per cent," or the equivalent. The court held invalid claims 9, 10, and 11, which did not so limit the amount of oil, but merely used the language "a small quantity of oil."

Nor does the case of *Eibel Process Co.* v. *Minnesota & Ontario Paper Co.*, 261 U. S. 45, support the position of appellants as set forth at pages 18 to 20 of their brief. In that case, the court found that the terms "substantial" and "high" were adequate to define the pitch. The claims at bar in the instant case contain no limitation that the proportion of oil is either "high" or "substantial," so that the issue here presented is different from the cited case.

Neither does the case of *Chadeloid Chemical Co.* v. *Wilson Remover Co. et al.*, 224 Fed. 481, cited at page 20 of appellants' brief, support appellants' contention. In the cited case process or method claims were not involved. While the court did rule that it was not necessary to specify the exact proportion of wax, nevertheless, consideration of the case makes it plain that the invention was in the claimed combination including wax as an ingredient, and not in the use of any particular proportion of wax. In the case at bar, the use of oil in coating material for paper is old. (Finding of Fact 3, Appendix for Appellants, page 7). It is apparent that merely adjusting proportions of ingredients is not an invention. *In re Richter,* 19 CCPA 756, 53 F. 2d 525. The conclusion is inescapable that the invention of appellant Montgomery resides not in using oil, or in adjusting the proportion of oil, but resides only in the use of particular proportions of oil, namely, the proportions necessary to produce the result stated in the claims at bar.

The case of *Burke Electric Co.* v. *Independent Pneumatic Tool Co.,* 232 Fed. 145, cited at page 20 of appellants' brief affords no support for appellants' position. The court pointed out that the attack upon the specification is threefold, the last objection being that the claims are functional. Referring to the functional words, the court held that "Nothing is gained or lost by these words; * * *." This is in harmony with the case of *In re Caunt, supra.* In other words, claims are not bad merely by the inclusion of language describing the function, but such words alone cannot be relied upon to impart patentability.

Finally, the case of *Procter & Gamble* v. *Refining,* 135 F. 2d 900, cited at page 21 of appellants' brief, adds no weight to appellants' position. In making the holding quoted by appellants, the court relied upon *Minerals Separation, Ltd.* v. *Hyde,* already hereinbefore discussed, as being a similar situation. As already hereinbefore pointed out in detail, that case has been shown to afford no support for appellants' position.

3. The District Court found (Conclusion of Law 2, Appendix for Appellants, page 8) that mere statement of the result in a method claim without definitely stating the step responsible for the result, does not "particularly point out and distinctly claim" the invention, as required by 35 U. S. C. 33. This conclusion is supported by the case of *In re Caunt, supra,* as well as by *Koebel* v. *Coe,* 70 App. D. C. 261, 105 F. 2d 784, and authorities therein cited.

Under the statute, it is the claims of the patent which define the invention. Even if there were invention in appellants' proportions set forth in the specification, it would not aid them where the proportions are not set forth in the claims. *Murphy* v. *Coe,* 69 App. D. C. 225, 99 F. 2d 994.

4. The District Court found (Finding of Fact 5, Appendix for Appellants, page 8) that the rejected claims do not specify a definite amount of oil, but merely state that the proportion of oil, without stating what that proportion may be, is so adjusted as to accomplish the recited function or result.

The District Court further found (Conclusion of Law 3, Appendix for Appellants, page 8) that in the claims at bar, the step of "adjusting the proportion of said film-forming oil * * *" is dependent upon the result desired, rather than the result being dependent upon the step. Where such is the situation, the method claims are not allowable. See *In re Duggan et al.,* 29 CCPA 765, 124 F. 2d 215, and authorities therein cited. This case was cited by the Board of Appeals in the Patent Office (Appendix for Appellants, page 51, last paragraph). Appellants' brief is submitted to present no adequate traverse of the holding there made by the Board of Appeals, which holding was upheld by the District Court. A reasonable finding of the Patent Office and District Court should not be set aside. *Besser* v. *Ooms,* 81 U. S. App. D. C. 7, 154 F. 2d 17, and authorities therein cited under footnote 3.

5. The District Court found (Conclusion of Law 4, Appendix for Appellants, page 9) that the claims at bar are vague and indefinite at the precise point of novelty and not sufficiently definite for patentability. It has hereinbefore been urged that the record shows that the invention of the appellant Montgomery was not adding oil to the material used to make coated paper. That had been done before. It has also been hereinbefore urged that it is apparent that merely adjusting the proportion of oil is not an invention. The conclusion was expressed that it is only when the oil is adjusted to certain proportions that any invention at all is exhibited.

The District Court found (Finding of Fact 4, Appendix for Appellants, page 7) that the allowed claims specify the quantity of oil to be used as a range which includes the quantities prescribed in the specific examples recited in the specification.

The District Court further found (Finding of Fact 5, Appendix for Appellants, page 8) that the rejected claims do not specify a definite amount of oil, but merely state that the proportion of oil, without stating what that proportion is, is so adjusted as to accomplish the recited function or result.

It is submitted that the definition in the rejected claims falls within the prohibition of *General Electric Co.* v. *Wabash Appliance Corp. et al.*, 304 U. S. 364. There the court pointed out that the vice of a functional claim exists "also when the inventor is painstaking when he recites what has already been seen, and then uses conveniently functional language at the exact point of novelty."

CONCLUSION

It is therefore submitted that the claims at bar fail to point out the invention with the distinctness contemplated by 35 U. S. C. 33, that the District Court was right in upholding the ruling of the Patent Office tribunals to that effect, and that accordingly the judgment from which appeal has been taken should be affirmed.

E. L. Reynolds,
Solicitor, United States Patent Office.

H. S. Miller,
Of Counsel.

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IN THE

UNITED STATES COURT OF APPEALS

FOR THE DISTRICT OF COLUMBIA CIRCUIT

United States Court of
For The
District of Columbia C

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Joseph W. Stew

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Appeal No. 10,655

WILLIAM J. MONTGOMERY and THE CHAMPION PAPER AND FIBRE COMPANY,
Appellants,

v.

JOHN A. MARZALL, COMMISSIONER OF PATENTS,
Appellee.

APPELLANTS' REPLY BRIEF

CLARENCE M. FISHER,
National Press Building,
Washington 4, D. C.

W. BROWN MORTON,
247 Park Avenue,
New York 17, N. Y.

Attorneys for Appellants.

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The Question Presented

The appellee's statement of the question presented consists merely of a quotation of a portion of the principal claim before the Court. Of course, the question presented s whether or not the claims refused by the Patent Office should have been allowed and if the appellee intended to so state the question presented the entire claim should have been quoted. The quotation of the entire claim would not have fully stated the question presented, for it is never proper to consider patent claims *in vacuo*. Claims are always read in the light of the specifications and of the state of the art to which they relate.

We believe, therefore, our statement of the question presented is a complete and correct statement of such question, although perhaps a further qualification might have been included, namely, that the correct quantity of the substance required under varying conditions can be readily determined by one skilled in the art (Finding No. 6, Appellants' App. 9).

Appellee's Summary of Argument

We are in accord with the rule with regard to method claims expressed in numbered paragraph 1 of the Appellee's Summary of Argument.

We are not in accord with appellee's numbered paragraph 2. The authorities cited in appellants' brief are pertinent because based on closely analogous facts or because they state or reaffirm a pertinent rule of law, as we shall hereafter point out.

We are in accord with the general statement embodied in paragraph 3 of appellee's Summary of Argument.

Paragraph No. 4 of the appellee's argument is quite incomprehensible and was at the time that it was presented to the District Court as part of the appellee's proposed conclusions of law. The result desired (and obtained by the process defined in the claims) is the continuous production of cast coasted paper of high quality. This result is dependent upon adjusting the quantity of oil to effect the clean separation of the paper from the casting surface when the coating has fully "set". To say that this step of "adjusting the proportion of film-forming oil, etc." is "dependent on the result" is contrary to the fact and does not make sense.

Paragraph 5 of the appellee's Summary of Argument is not supported by the facts, as we shall hereinafter point out in our reply to the appellee's argument on this point.

Appellee's Argument

Appellee's argument in support of points 1 and 3 requires no further answer. We are in accord with appellee's statement as to the requirements of method claims, but in his argument he makes no attempt to point out wherein the claims at bar fail to meet these requirements, and a mere reading of the claims makes it apparent that every step in the process of making cast coated paper is definitely recited.

As stated above, appellee's point 4 as recited in his Summary of Argument is incomprehensible and it is not in any way clarified by his argument.

Under point 2 appellee contends that none of the cases cited by appellants is pertinent to the questions here involved. He then quotes portions which do not apply and conveniently ignores the pertinent portions of the decisions.

The claims held valid in *Minerals Separation* v. *Hyde*, 242 U. S. 261, recited an upper limit on the percentage of oil used, in order to distinguish their process from the otherwise identical prior processes known as the "surface flotation" process and the "metal sinking" process. The present case differs from that in that there were no such prior processes. Oil had never been used in making cast coated papers. The pertinent portion of this decision is that beginning as follows:

> "Equally untenable is the claim that the patent is invalid for the reason that the evidence shows that when different ores are treated preliminary tests must be made to determine the amount of oil and the extent of agitation necessary in order to obtain the best results."

This decision is pertinent and supports the claims at bar over the objection that they are indefinite because they require some experimentation to determine the amount of oil necessary to secure best results with different coating compositions, different oils, etc.

The appellee contends that *Eibel Process Co.* v. *Minnesota and Ontario Paper Co.,* 261 U. S. 45 is not pertinent because the appellants have not used the specific wording "substantial" and "high" sustained in that case. The pertinent point in this case is the holding that claims may be considered to meet the requirement of the statute as to definiteness without the use of numerical limitations for lack of which the appellee would have the present claims refused.

The quoted portion of *Chadeloid* v. *Wilson,* 224 F. 481, 484 (Appellants' main Brief, p. 20) would apply directly to the present case if the word "oil" were substituted for the word "wax". Appellee attempts to distinguish from the present case by stating that in that case the invention lay in including wax as an ingredient, not in the use of any particular proportion of wax. It was found as a fact, however, by the Court below (Finding of Fact No. 5)* that the present invention lies in using oil in a process where it has never been used before. This case is closely parallel to the case at bar and that the Court's reason for upholding the claims, *viz.,* that a statement of the exact percentage would enable anyone to evade the patent, applies with equal force to the present case.

The case of *In re Richter,* 53 F. (2) 525 cited by the Appellee in this connection is clearly irrelevant. The process there claimed involved an improvement in an old process which involved only a slight change in the percentage of two of the reagents previously used in a process otherwise identical. In the present case, oil has never before been used in a process of making cast coated paper. The appellee in this connection makes the statement (Brief, page 4) that "The conclusion is inescapable that the invention of appellant Montgomery resides not in using oil, or in adjusting the proportion of oil, but resides only in the use of particular proportion of oil * * *." This statement is wholly unjustified and is directly contrary to the facts as found by the Court below. The appellee has shown no case in which any proportion of oil had ever been used for any purpose in making cast coated paper.

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* "The invention claimed in the rejected claims is a proces of making cast coated paper all the essential steps of which ar recited in the claims. The novelty resides in the addition of oi to the coating composition as one of the steps of that process * * *." (Finding of Fact No. 5, Appellants' App. 8.)

The appellee completely misapplies the citation to *Burke* v. *Independent,* 232 Fed. 145, as quoted on page 20 of Appellants' Brief and then concludes that the case does not support the appellants' position. This case was cited with regard to the question of *definiteness* which is the only question raised by this appeal. On this question at bar, that of *definiteness,* the decision is clearly pertinent and clearly supports the appellant's form of claim. The decision draws an analogy with an instruction to a chemist to add a reagent until precipitation occurs, and then states that this "would be an absolutely accurate guide to the result though the quantity varied with temperature or atmospheric humidity."

This is completely analogous to the claims at bar which direct the operator to determine the amount of oil by a readily observable occurrence when the right amount is used.

Appellee dismisses the decision in *Procter and Gamble Mfg. Co.* v. *Refining, Inc.,* 135 F. (2) 900 because in that decision the Court cited (among many other cases) the case of *Minerals Separation* v. *Hyde* claimed by appellee not to apply to the present case. This case is applicable to the question here in issue for the reasons stated above in connection with the *Minerals Separation* case. This case particularly resembles the present case in that there, too, the Court below had found that "sufficient information is found in the patent to guide one skilled in the art to adopt [adapt] the process to different grades and qualities of oil * * *" (135 F. 2d 902).

Under point 5 of his Summary of Argument, appellee contends that the rejected claims are vague and indefinite "at the precise point of novelty". As we pointed out at length in our main brief, the language of the claims is not open to this objection at any point. Moreover the language in the claims which the lower Court found to be vague and indefinite is not in any way related to the question of novelty.

Finding of Fact No. 5 correctly states that the invention claimed is "a process of making cast coated paper" and that the "novelty resides in the addition of oil to the coating composition as one of the steps of that process". This applicant was the first to add oil in any amount "to the coating composition as one of the steps of that process" *i.e.* "making cast coated paper" and the recitation in the claims of the addition of oil to the coating composition as a step in the process excludes the prior art without any limitation whatsoever as to the amount of oil. Appellee's argument in support of this point is based on the erroneous assumption that applicant's invention is a composition of matter and that the novelty resides in including as an ingredient of that composition a particular quantity of oil as distinguished from some other quantity of oil previously used.

The invention, as stated above, is a method of making cast coated paper. Any more generic designation of the invention is meaningless, because it is only in the making of *cast* coated paper that the problem of regulating the adhesion of the coating to a casting surface occurs. The novel and useful effect obtained by the practice of the process is the maintenance on the casting surface of a film of oil of microscopic thickness. This film of oil is maintained by the adsorption of oil from the coating composition and hence, in order to maintain film on the casting surface oil is added to the coating composition. The oil itself becomes no part of the coating composition in the sense that the layer of coating is different when the oil is added. It cannot even be detected in the layer of coating by analysis or otherwise. It does not make the coating layer a different kind of coating layer from the same composition without the oil. Its addition is purely a procedural step in order to secure the proper condition of the casting surface so that the process may be carried out continuously as a 24-hour operation day after day. The use of oil in paper coating compositions to prevent foaming has no more relation to the invention here in issue than the use of oil as a carrier for the pigment in coating compositions such as paint or ink.

Conclusion

The lower Court found (Finding of Fact No. 2) that the "quantity of oil required * * * varies greatly depending upon the ingredients of the coating composition, its acidity, the particular oil used, the extent to which it is emulsified and other factors; and to be useful must be adjusted with respect to such variable characteristics of the coating composition." The lower Court also found that the proper quantity of oil for the particular specifications of coating conditions could be determined by one skilled in the art. Under these circumstances, to define the quantity of oil as an exact percentage serves merely to exclude from the scope of the patent processes for making cast coated paper wherein, due to the particular acidity, emulsification and selected ingredients, a quantity of oil greater than the stated percentage may be used without preventing the adhesion of the coating to the casting surface until the coating is nonplastic.

There is no just ground for the requirement that the appellants dedicate this valuable invention to their competitors.

Clarence M. Fisher,
W. Brown Morton,
For Appellants.